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ABSTRACT

Numerous activities related to thirteen behavioral objectives for rational numbers are presented in this booklet. For each of the objectives, a list of short activities and lab activities is given. Student worksheets for the activities are provided. Concepts covered include writing numerals; representing fractions; finding equivalent fractions; reducing fractions; working with mixed numbers; determining greater than and less than relationships; finding common denominators; finding reciprocals; and adding, subtracting, multiplying, and dividing fractions. (DT)

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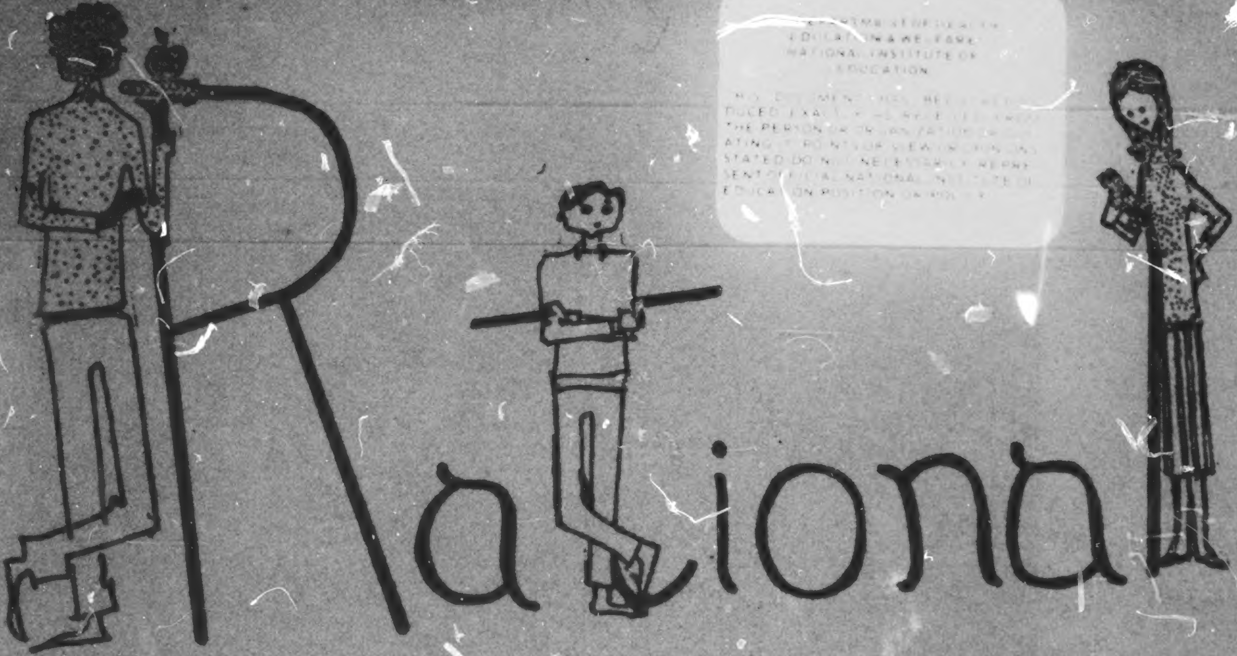

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CENTRAL IOWA MATHEMATICS PROJECT

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SE 022 593

CENTRAL IOWA MATHEMATICS PROJECT

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Des Moines Independent Community School District
under
Title III E.S.E.A., PL 89-10

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FOREWORD

HISTORY OF CILAMP

CILAMP is a mathematics project funded through the Des Moines Independent Community School District under a grant from Title III, P.L. 89-10, ESEA, funds. It began in July, 1967, in a ten-county area in central Iowa. It was subsequently (1968) expanded to a thirteen-county area.

CILAMP was designed to give low achieving junior high students a greater appreciation and command of mathematics through teacher training and the development of appropriate materials and techniques. The project began with twenty-nine teachers from the original ten-county area. These teachers attended a three-week summer school (July, 1967) to acquaint themselves with CILAMP materials and philosophies. They continued to meet during the 1967-1968 school year on Saturday mornings twice each month. These in-service meetings provided a sharing of ideas and dissemination and evaluation of materials and teaching techniques.

In June of 1968, twenty-nine additional teachers were selected from the expanded thirteen-county area to participate in CILAMP. These new teachers, along with some of the original twenty-nine, took part in a six-week summer workshop wherein they taught summer school classes in junior high mathematics and had the opportunity to write materials of their own. Eighteen Saturday meetings (two per month) were held for these teachers during the 1968-1969 school year.

ABOUT THIS BOOKLET

Through the efforts of the fifty-eight participating teachers and the CILAMP staff, we are now able to offer a series of booklets as the culmination of the past two year's work. Although these booklets were compiled by a team of eleven participating teachers, the efforts and contributions of all fifty-eight teachers are represented. Please note the references to other CILAMP publications throughout this work.

The following pages represent one of several such booklets prepared by teachers who have participated in CILAMP. The purpose of this booklet is to provide the classroom teacher with numerous resources and activities pertinent to selected student behavioral objectives. The activities included herein were chosen from a variety of sources, including some original ideas offered by CILAMP teachers.

Jack R. Williams, Director
Les A. Lewis, Coordinator
David R. O'Neil, Coordinator

ACKNOWLEDGMENTS

The efforts of the following CILAMP participants, resulting in the compilation of this series of booklets, is gratefully acknowledged. A special thanks is also extended to Sarah McCabe and William Shay for the excellent job they did in identifying the objectives for each booklet.

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SPECIFIC OBJECTIVES

In writing the objectives for the mathematical concepts described in this booklet, only one part of a three-part behavioral objective was used as outlined by Robert F. Mager in his book, Preparing Instructional Objectives. According to Dr. Mager, a behavioral objective tells the following three things:

1. What the learner will be DOING to demonstrate he has reached the objective.
2. Under what conditions the learner will be expected to demonstrate competence.
3. By what standards the learner will be evaluated.

Only the first of the three parts was used in this booklet and it is referred to as "Specific Objectives."

Because students have varied attitudes toward learning and different abilities, the conditions which are imposed upon them will vary from student to student. The standards used to evaluate successful attainment of an objective will also vary as students vary. It is CILAMP's intent that each teacher who uses this booklet will determine the individual conditions and standards for evaluation being cognizant of the interest and ability of each student.

HOW TO USE THIS BOOKLET

The activities included in this booklet are, in and of themselves, not intended to bring about the indicated student behavior. They should be used only as a guide to that end.

First, identify the desired objective from the Table of Contents. Then, you will be referred to a page in the Specific Objectives section. Under the selected objective is a listing and/or description of both Short Activities and Lab Activities which are allied to the objective. The Short Activities are primarily five to ten minute drill or introductory activities. The Lab Activities are ordinarily of longer duration and emphasize student involvement. Upon locating an activity you wish to use, you will be referred to the appropriate section and page.

The scheme for numbering the Short Activities and Lab Activities is designed to allow activities to be added without disrupting the numbering system. Indeed, you are encouraged to do so! The Short Activities are denoted with an S- prefix. The Lab Activities have an L- prefix. In each case, the activities are numbered consecutively from one.

In some cases, where the activities are games, the instructions for those games are included in the Specific Objectives section. Under these circumstances, no activity sheet is given.

The Resource section is designed to provide you with a listing of other sources of material pertinent to the subject of this booklet.

RATIONAL NUMBERS

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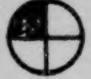
SPECIFIC OBJECTIVES

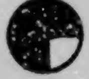
The student should be able to:

OBJECTIVE I: Given a set of models, write the numeral which represents the fractional parts indicated for each model.

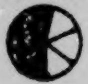
Example:



$\frac{1}{4}$



$\frac{3}{4}$



$\frac{4}{7}$

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3. Finding the Missing Parts 3
4. Making Fractions on Graph Paper 3
B. LAB ACTIVITIES
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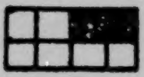
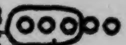
2. Finding Parts of a Unit 4
3. Star Parts 6
4. You Name It 6
5. Over Orange 7
6. Fenced In 19

OBJECTIVE II: Given a set of fractions, make a model to represent each fraction.

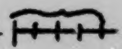
Example: Given: $\frac{2}{8}$



Given: $\frac{3}{5}$



Given: $\frac{4}{6}$



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1. What Does It Take to Make One 22

OBJECTIVE IV: Given a list of fractions, rename each by writing a fraction with the least possible denominator.

Example: Rename $\frac{10}{15}$ as $\frac{2}{3}$

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OBJECTIVE V: Given a list of fractions, rename each by writing a fraction with a greater denominator.

Example: Rename $\frac{2}{3}$ as $\frac{6}{9}$

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B. LAB ACTIVITIES

OBJECTIVE VI: Given a list of mixed numerals, rename each by writing an equivalent improper fraction.

Example: Given $4\frac{2}{3}$ write $\frac{14}{3}$

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OBJECTIVE VII: Given a list of improper fractions, rename each by writing a mixed numeral.

Example: Given $\frac{4}{3}$ write $1\frac{1}{3}$

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OBJECTIVE VIII: Given an ordered pair of fractions, write the first as greater than, less than, or equal to the second. Use the symbols <, >, or =.

Example: Given $\frac{2}{3}, \frac{2}{5}$ write $\frac{2}{3} > \frac{2}{5}$.

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OBJECTIVE IX: Given a list of pairs of fractions, each pair having equal denominators and each pair having either the (+) or the (-) operational sign, the learner can perform the operation indicated and rewrite the sum or the difference in its simplest form.

Example: Given $\frac{1}{5} + \frac{2}{5}$ write $\frac{3}{5}$ as the sum.

Given $\frac{3}{8} - \frac{1}{8}$ write $\frac{1}{4}$ as the difference.

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OBJECTIVE XII: Write the reciprocal of any non-zero fraction.

A. SHORT ACTIVITIES
B. LAB ACTIVITIES

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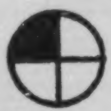
RATIONAL NUMBERS

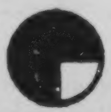
SPECIFIC OBJECTIVES

Objective I. Given a set of models, write the numeral which represents the fractional parts indicated for each model.

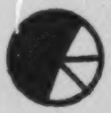
Example:



$\frac{1}{4}$



$\frac{3}{4}$



$\frac{4}{7}$

A. SHORT ACTIVITIES **Page**

1. In What Part Are We Interested? ------------------------ S-1

Material(s): Student activity sheet

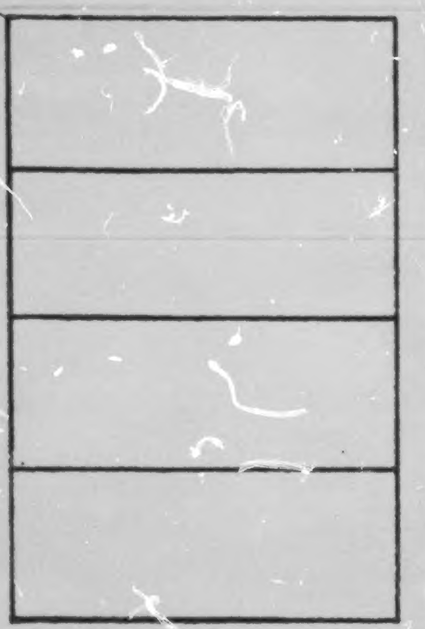
Solution(s):

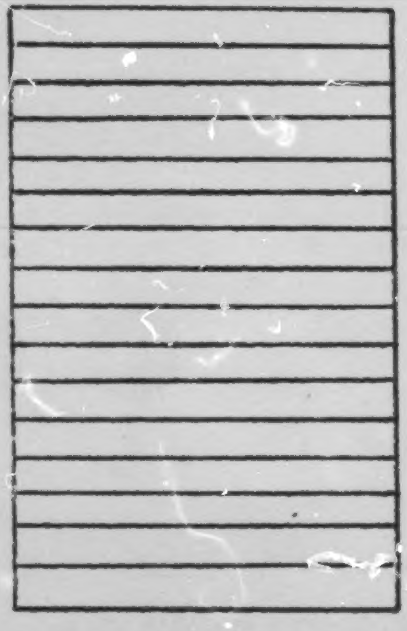
	Numerator or Interested In	Denominator or Total	Fraction or Comparison
1.	2	6	$\frac{2}{6}$
2.	6	7	$\frac{6}{7}$
3.	4	5	$\frac{4}{5}$
4.	1	6	$\frac{1}{6}$
5.	2	8	$\frac{2}{8}$
6.	1	6	$\frac{1}{6}$
7.	4	4	$\frac{4}{4}$
8.	1	2	$\frac{1}{2}$
9.	2	4	$\frac{2}{4}$
10.	3	6	$\frac{3}{6}$
11.	3	6	$\frac{3}{6}$
12.	5	10	$\frac{5}{10}$

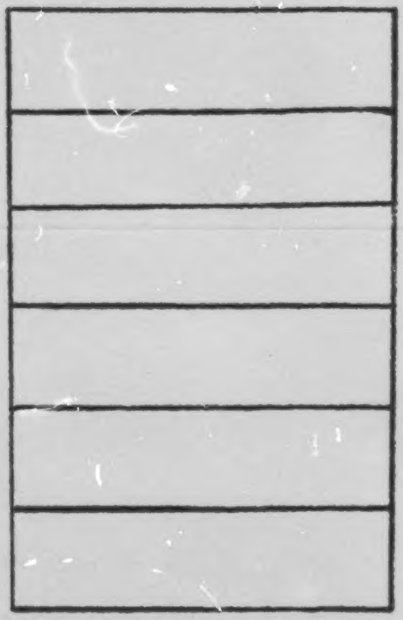
Conclusion: The last 5 fractions are equal.

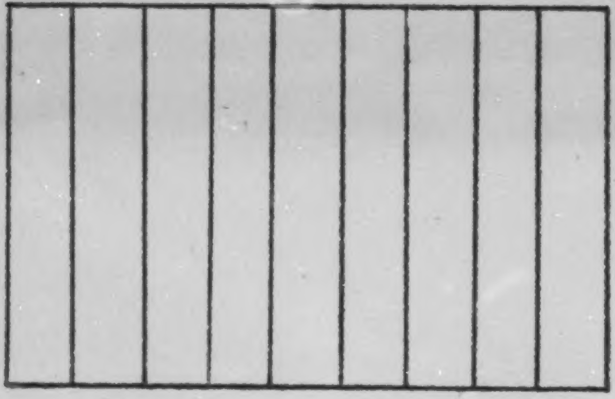
2. Fraction Relay Race -- None

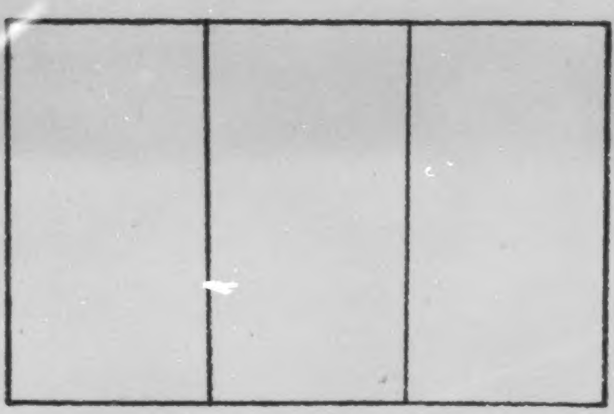
Material(s): Sets of cards made by the teacher with pictures of fractions on each card. See the examples on the next page.

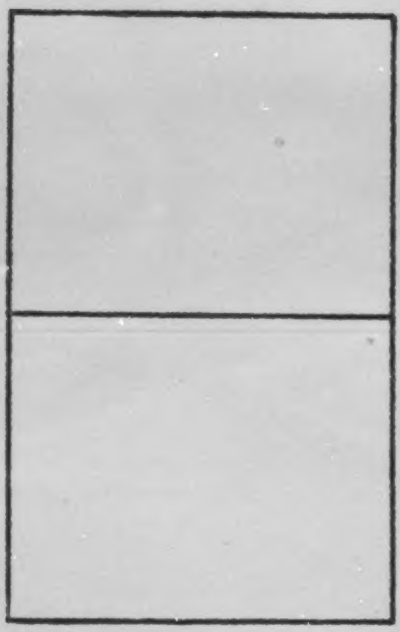


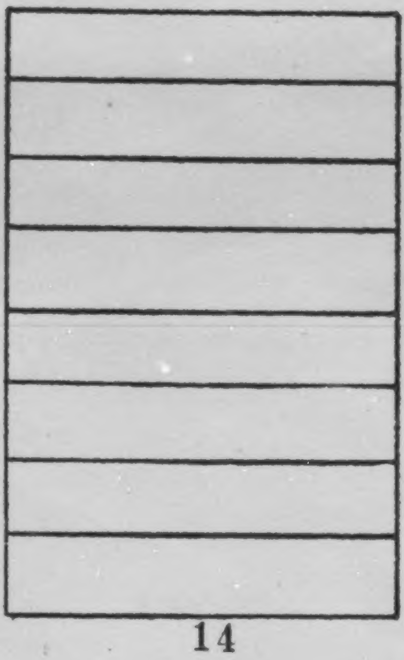


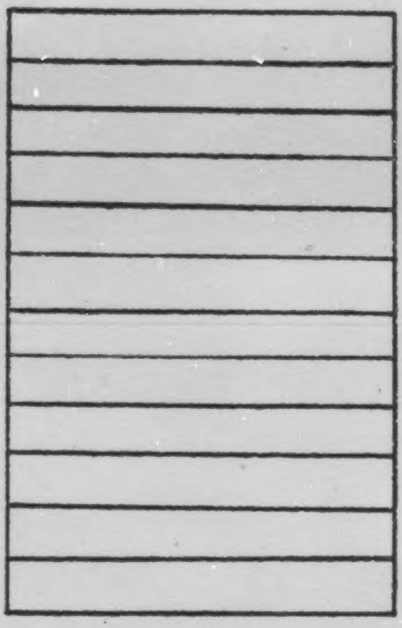












Directions for Fraction Relay Race:

Choose someone to divide your class into teams and seat them in rows. Make up sets of cards containing models of fractions for each team. Choose a captain for each team, and, as the captain of that team displays his first card in front of his row, the first student on the team writes the fraction represented by the picture and passes the paper to the student behind him. The captain then moves down the row and holds up another card so the second student may put down an answer. This continues to the end of the row, and the first team to give correct answers for all its cards wins.

You must shade parts of the cards to represent the numerator.

Page

3. Finding the Missing Parts ------------------------------- S-2

Material(s): Student activity sheet

Solution(s):

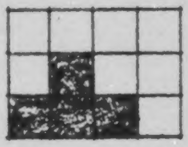
1. $\frac{2}{4}$ $\frac{1}{4}$ $\frac{1}{4}$
2. $\frac{1}{8}$ $\frac{2}{8}$ $\frac{5}{8}$
3. $\frac{1}{2}$ $\frac{1}{2}$
4. $\frac{2}{3}$ $\frac{1}{3}$
5. $\frac{1}{6}$ $\frac{3}{6}$ $\frac{2}{6}$
6. $\frac{2}{8}$ $\frac{2}{8}$ $\frac{4}{8}$
7. $\frac{4}{12}$ $\frac{5}{12}$ $\frac{3}{12}$
8. $\frac{5}{16}$ $\frac{7}{16}$ $\frac{4}{16}$

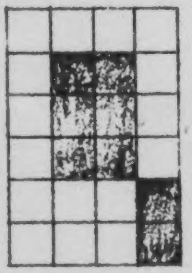
4. Making Fractions on Graph Paper ------------------------- None

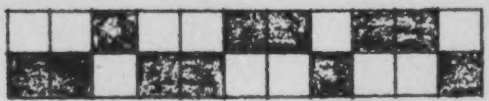
Material(s): Small sections of different sizes of graph paper.

Directions: Give each student small sections of different sizes of graph paper. Each student could then color a design or color as many squares as he wishes (he may not color all squares). Then the fractions representing the colored section (or uncolored, or both) could be written below it. Students could be called upon to tell what their fraction is.

Examples:







B. Lab Activities **Page**

1. Folding Units to Make Parts -------------------------------- L-1

Material(s): Student activity sheet and 4 or 5 strips of paper for each student. (You may wish to use 4 or 5 circles, rectangles, squares, etc., for each student instead of the strips of paper.)

Solution(s): 5. (1) $\frac{1}{2}$

(2) $\frac{3}{4}$

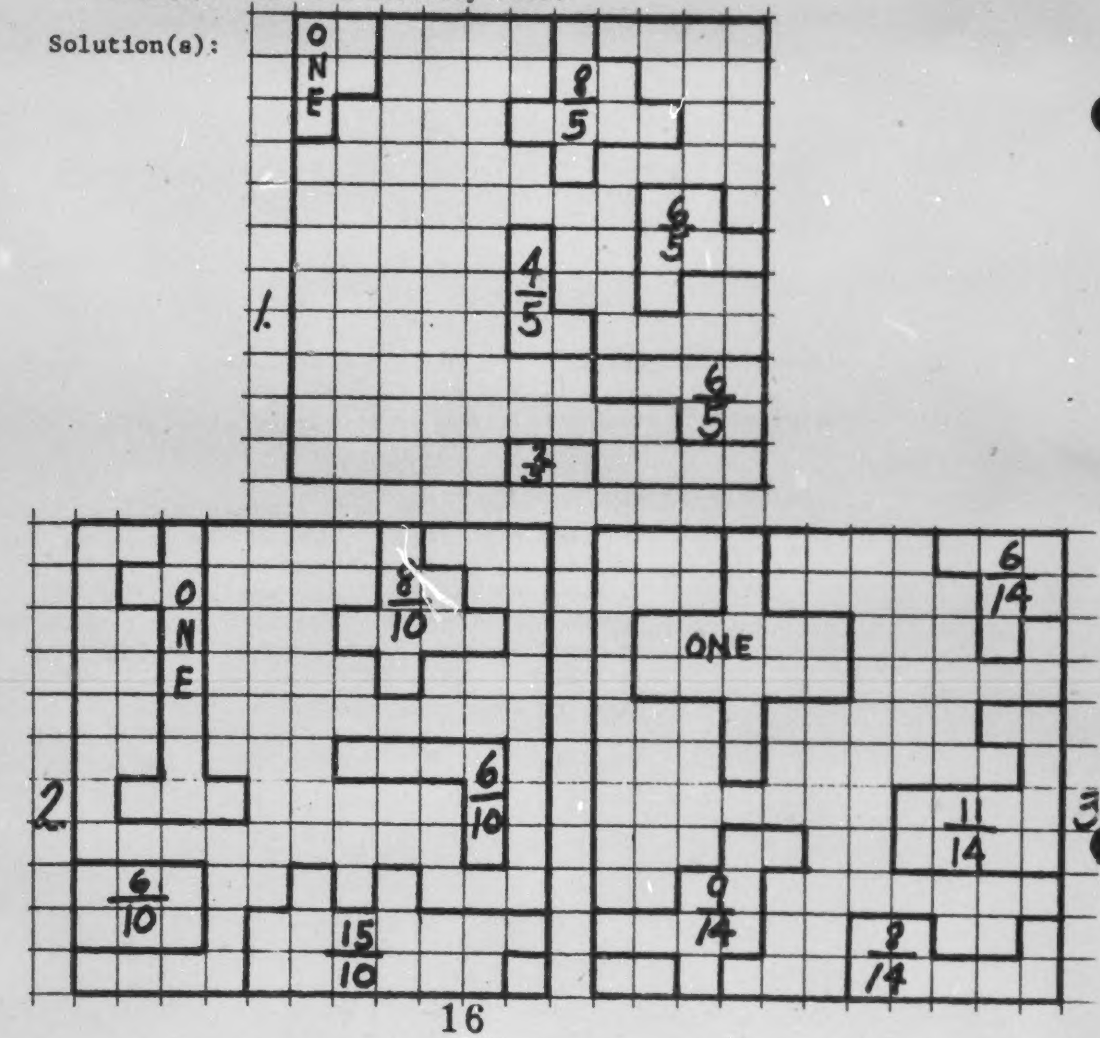
(3) $\frac{5}{8}$

(4) a. The answers
b. will
c. vary.

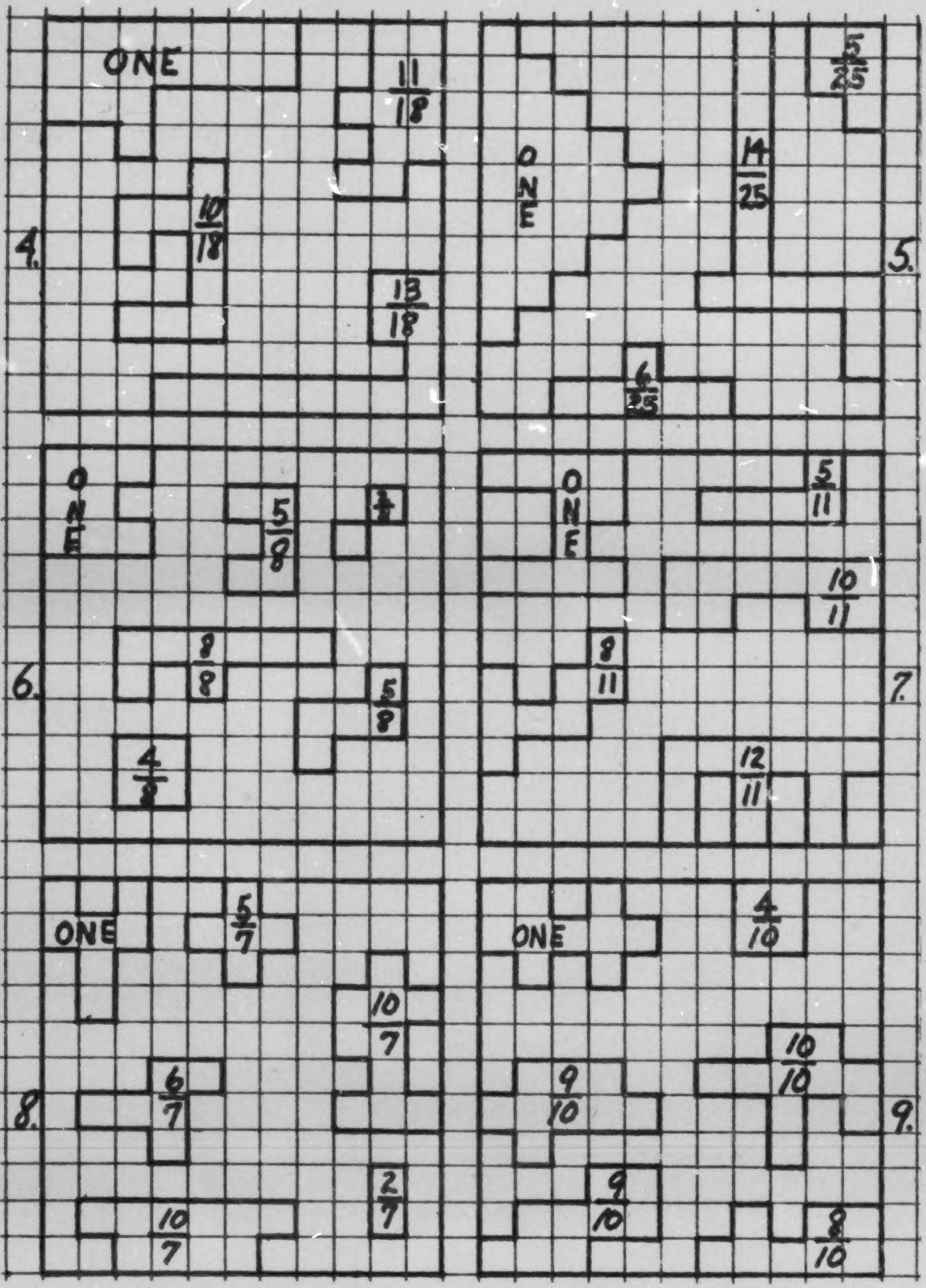
2. Finding Parts of a Unit ---------------------------------- L-2

Material(s): Student activity sheet

Solution(s):



1.
ONE
8/5
6/5
4/5
6/5
3/3
2.
ONE
8/10
6/10
6/10
15/10
3.
ONE
6/14
11/14
9/14
8/14


4.
ONE
11/18
10/18
13/18
5.
ONE
5/25
14/25
6/25
6.
ONE
5/8
1/8
8/8
5/8
4/8
7.
ONE
5/11
10/11
8/11
12/11
8.
ONE
5/7
10/7
6/7
2/7
10/7
9.
ONE
4/10
10/10
9/10
9/10
8/10

Page

3. Star Parts -- L-3

Material(s): Student activity sheets

Method: Determine what part is shaded or not shaded by using the reference star in the left corner of sheet one.

Solution(s):

	Shaded	Unshaded
1.	$\frac{12}{24}$	$\frac{12}{24}$
2.	$\frac{8}{24}$	$\frac{16}{24}$
3.	$\frac{6}{24}$	$\frac{18}{24}$
4.	$\frac{16}{24}$	$\frac{8}{24}$
5.	$\frac{3}{24}$	$\frac{21}{24}$
6.	$\frac{9}{24}$	$\frac{15}{24}$
7.	$\frac{4}{24}$	$\frac{20}{24}$
8.	$\frac{18}{24}$	$\frac{6}{24}$
9.	$\frac{2}{24}$	$\frac{22}{24}$
10.	$\frac{10}{24}$	$\frac{14}{24}$
11.	$\frac{14}{24}$	$\frac{10}{24}$
12.	$\frac{20}{24}$	$\frac{4}{24}$
13.	$\frac{15}{24}$	$\frac{9}{24}$
14.	$\frac{4}{24}$	$\frac{20}{24}$
15.	$\frac{8}{24}$	$\frac{16}{24}$
16.	$\frac{21}{24}$	$\frac{3}{24}$
17.	$\frac{22}{24}$	$\frac{2}{24}$

Reference: Math Round-Up (5)

4. You Name It -- L-4

Material(s): Student activity sheets

Solution(s):

A. $\frac{3}{4}$ B. $\frac{1}{4}$ C. $\frac{2}{4}$ or $\frac{1}{2}$ D. $\frac{3}{3}$ or 1 E. $\frac{1}{3}$ F. $\frac{2}{5}$

G. $\frac{2}{3}$ H. $\frac{3}{5}$ I. $\frac{4}{5}$ J. $\frac{1}{2}$ K. $\frac{1}{6}$ L. $\frac{5}{6}$ M. $\frac{3}{6}$ or $\frac{1}{2}$

N. $\frac{4}{6}$ or $\frac{2}{3}$

1) $\frac{2}{6}$ or $\frac{1}{3}$
2) $\frac{3}{8}$
3) $\frac{4}{9}$

4) $\frac{7}{10}$
5) $\frac{2}{6}$ or $\frac{1}{3}$
6) $\frac{1}{4}$

7) $\frac{2}{3}$
8) $\frac{3}{16}$
9) $\frac{4}{5}$

10) $\frac{7}{8}$
11) 3
12) $\frac{4}{7}$

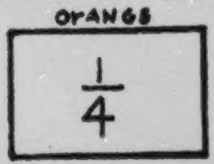
13) $\begin{array}{r}19\\ \text{x}2\\ \hline 38\end{array}$ $\quad$ $\begin{array}{r}64\\ \text{x}7\\ \hline 448\end{array}$ $\quad$ $\begin{array}{r}26\\ \text{x}8\\ \hline 208\end{array}$

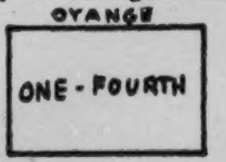
5. Over Orange --- Page None

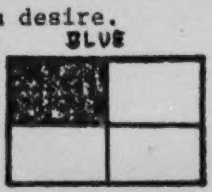
Material(s): Orange and blue paper or cards and the set of example cards given.

Method: Pupils seated around a table are to collect books of three cards, each, by matching fractions written in figures and in word form on orange cards and shown as pictures on blue cards. The set of cards for the fraction $\frac{1}{4}$ might appear as shown below.

(If you care to change or vary the game, circles, groups of dots, etc., can be substituted on the blue card, and a blank card has been included for you to do this if you wish.) You may also include other denominations and increase or decrease the difficulty of the game as you desire.







These cards can also be adapted to many of the other games and activities using fractions.

Student Directions: The object is to collect books of three cards, each, by matching fractions written in figures and in word form on the orange cards, and shown as pictures on the blue cards.

Pupils shuffle and deal all the blue cards, then all the orange cards. A player starts by saying "Over Orange," which is the signal for each student to pass one orange card to the player on his right.

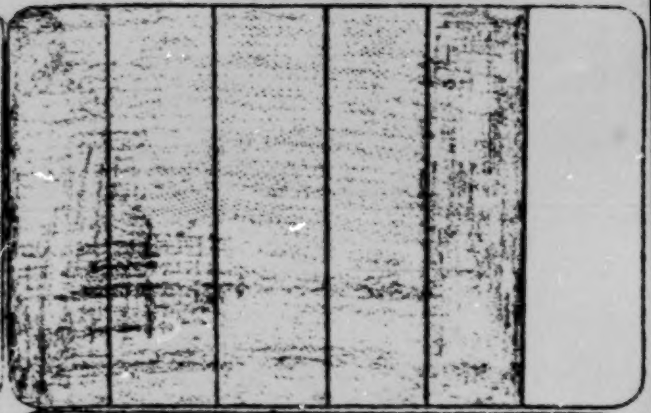
The following are for "OVER ORANGE" -- pages 8 - 16.

The orange cards will be the cards with the number fraction and the word fraction.

The blue card will be the card with the picture fraction.

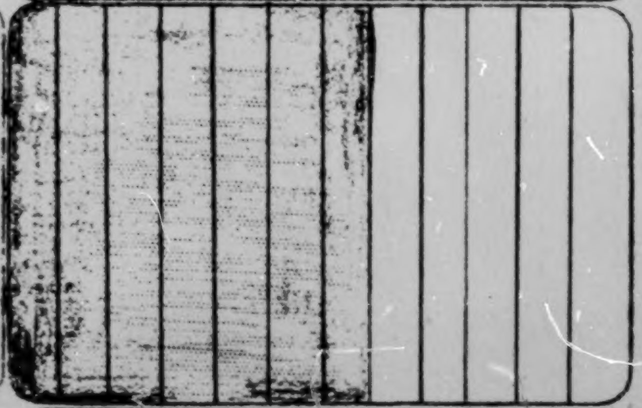
$$\frac{5}{6}$$

FIVE - SIXTHS



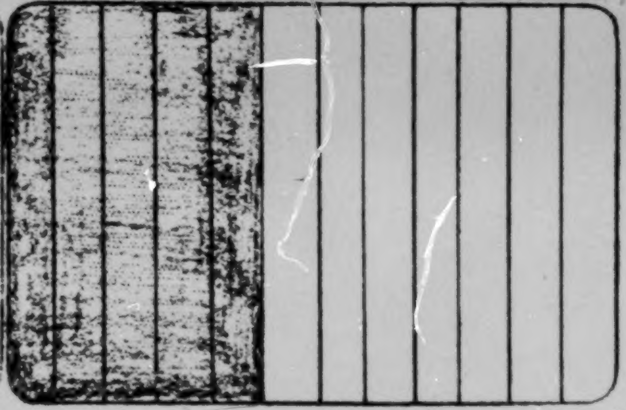
$$\frac{7}{12}$$

SEVEN - TWELFTHS



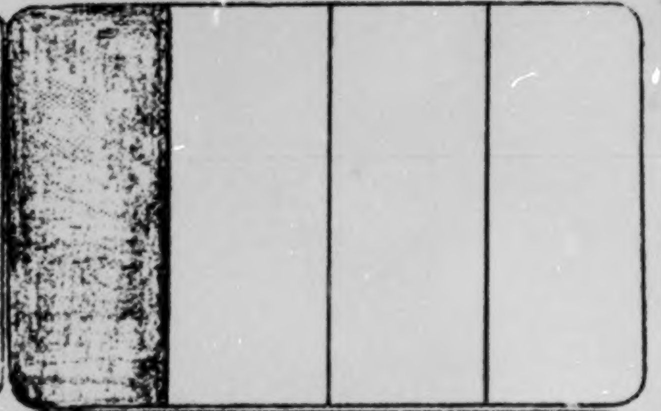
$$\frac{5}{12}$$

FIVE - TWELFTHS



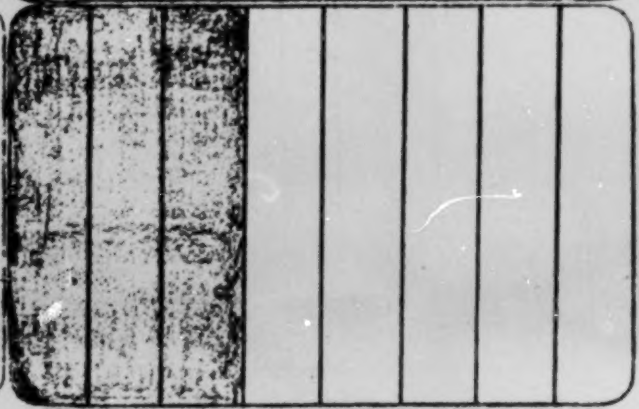
$\frac{1}{4}$

ONE - FOURTH



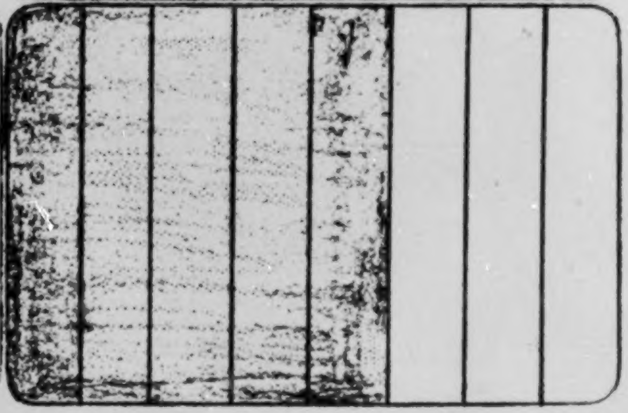
$\frac{3}{8}$

THREE - EIGHTHS



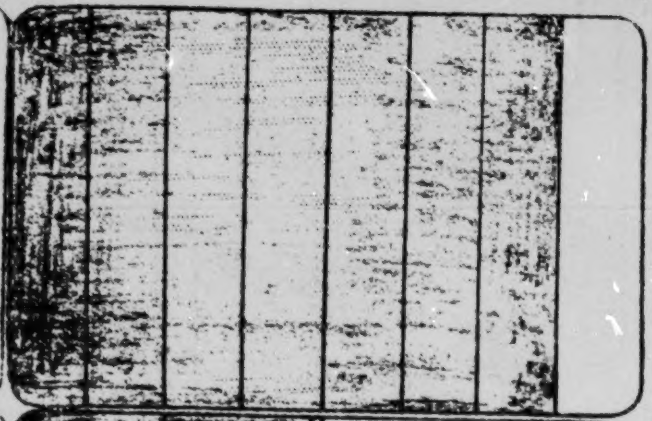
$\frac{5}{8}$

FIVE - EIGHTHS



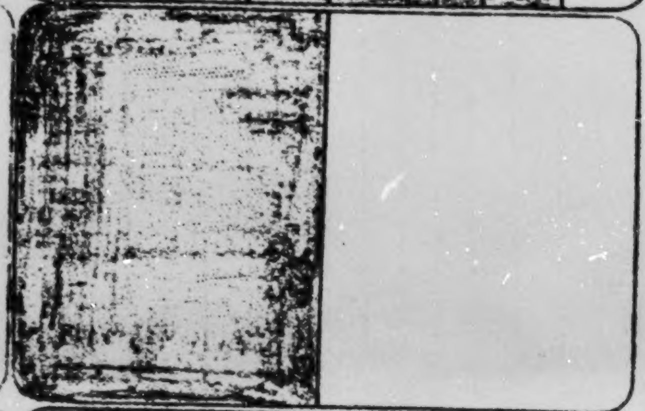
$\frac{7}{8}$

SEVEN - EIGHTHS



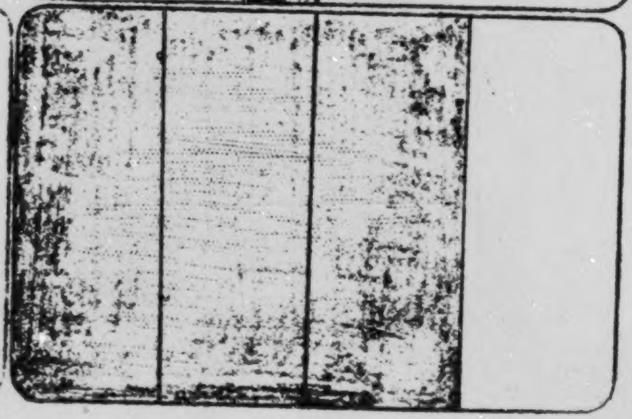
$\frac{1}{2}$

ONE - HALF



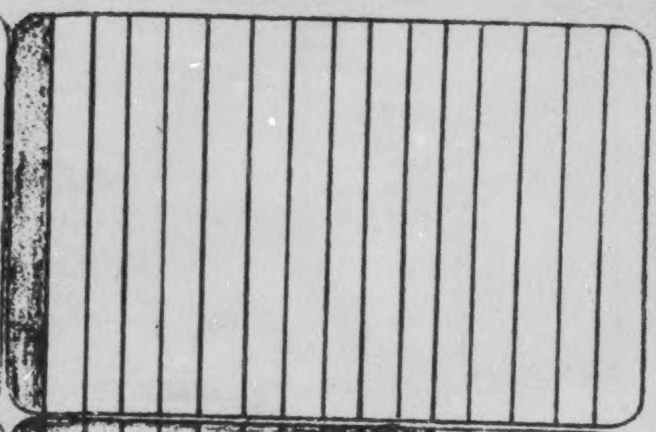
$\frac{3}{4}$

THREE - FOURTHS



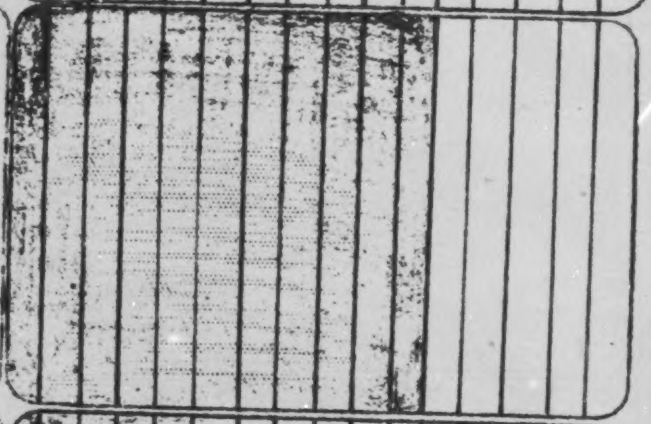
$\frac{1}{16}$

ONE - SIXTEENTH



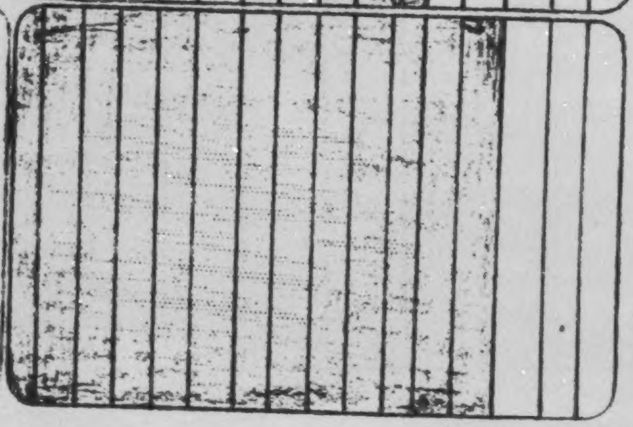
$\frac{11}{16}$

ELEVEN-SIXTEENTHS



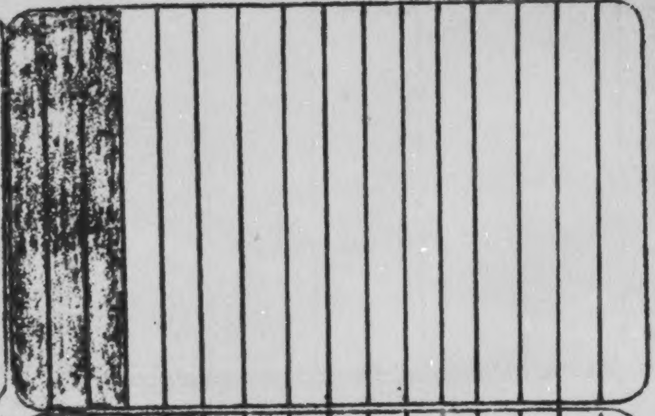
$\frac{13}{16}$

THIRTEEN-SIXTEENTHS



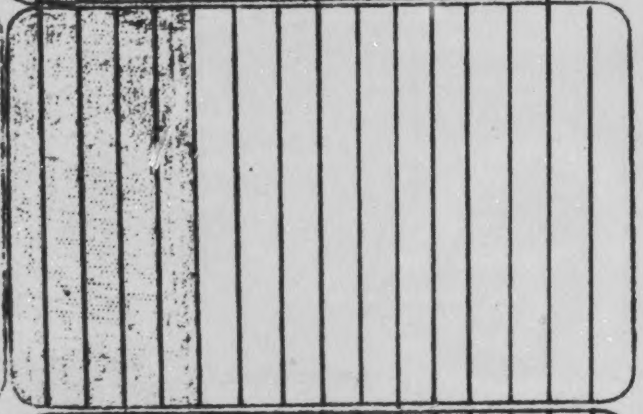
$$\frac{3}{16}$$

THREE - SIXTEENTHS



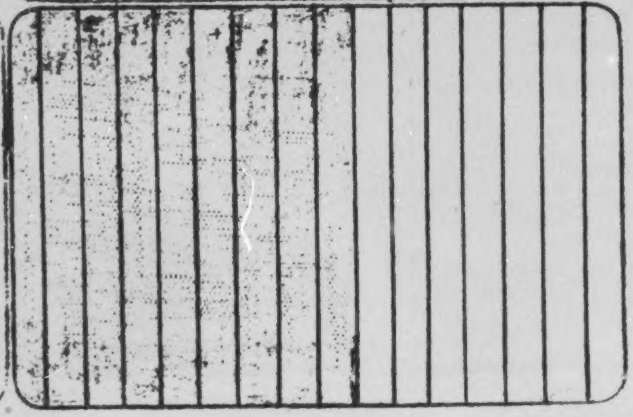
$$\frac{5}{16}$$

FIVE - SIXTEENTHS



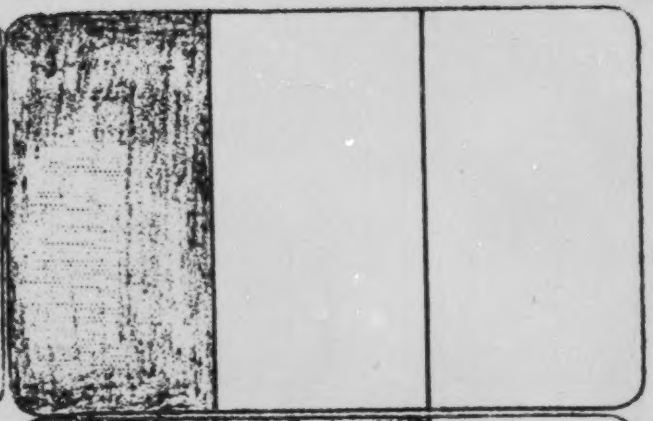
$$\frac{9}{16}$$

NINE - SIXTEENTHS



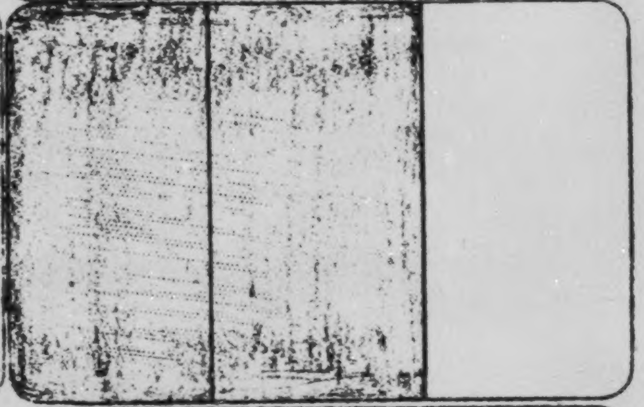
$$\frac{1}{3}$$

ONE · THIRD



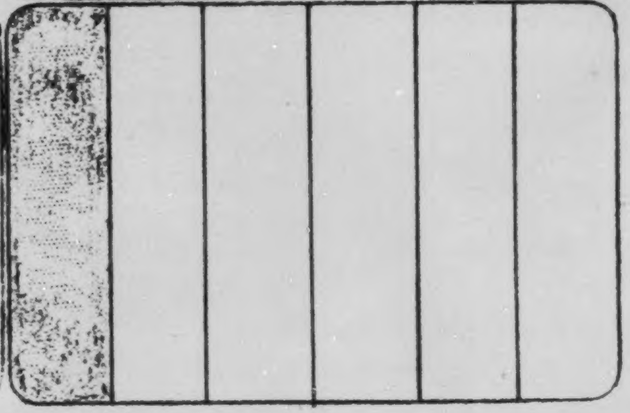
$$\frac{2}{3}$$

TWO - THIRDS



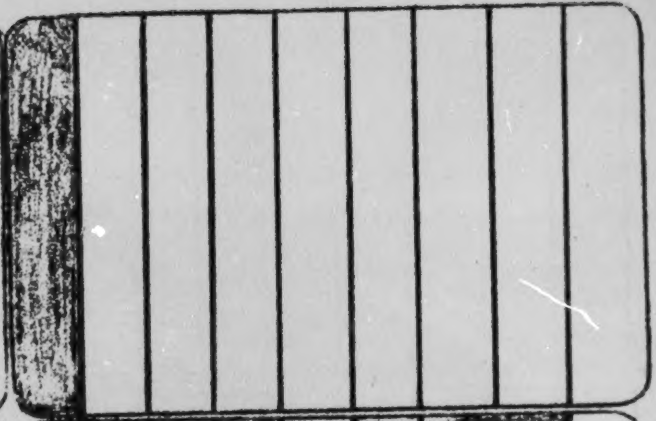
$$\frac{1}{6}$$

ONE - SIXTH



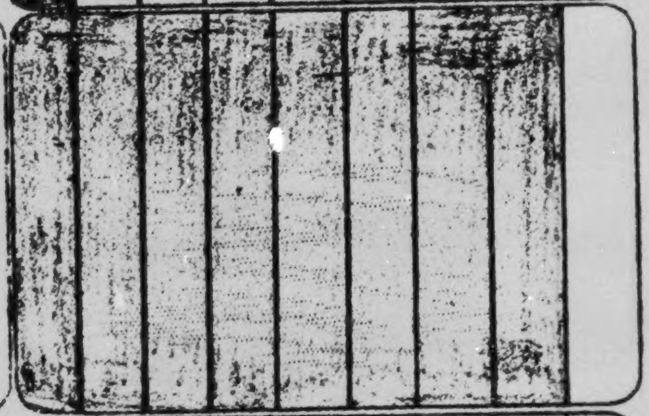
$\frac{1}{9}$

ONE - NINTH



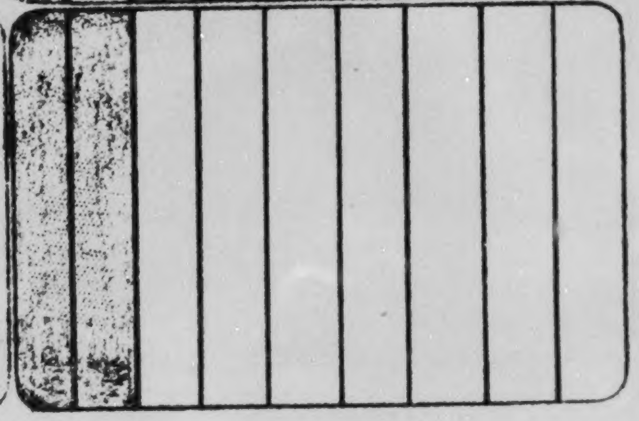
$\frac{8}{9}$

EIGHT-NINTHS



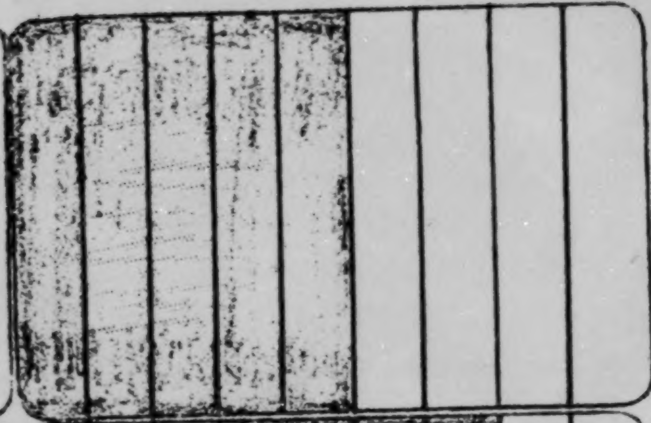
$\frac{2}{9}$

TWO-NINTHS



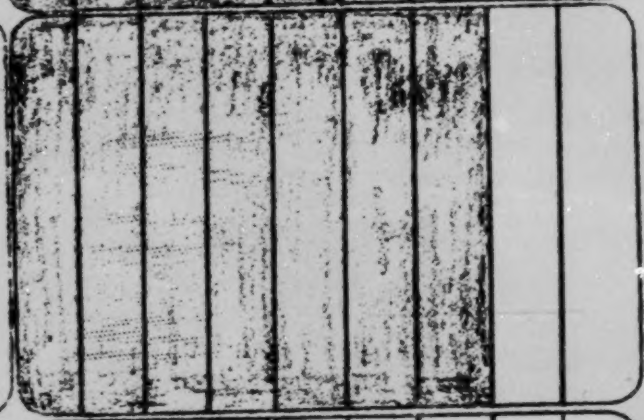
$\frac{5}{9}$

FIVE-NINTHS



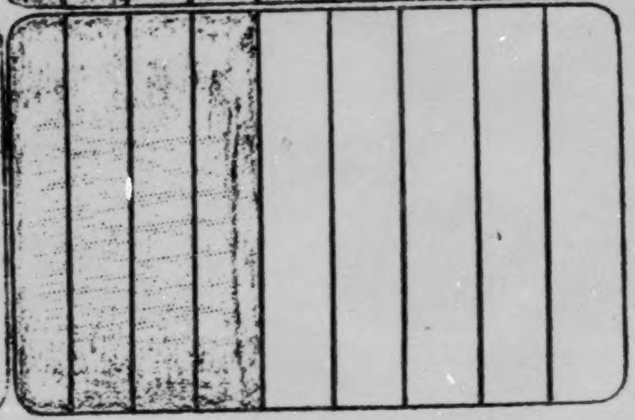
$\frac{7}{9}$

SEVEN-NINTHS



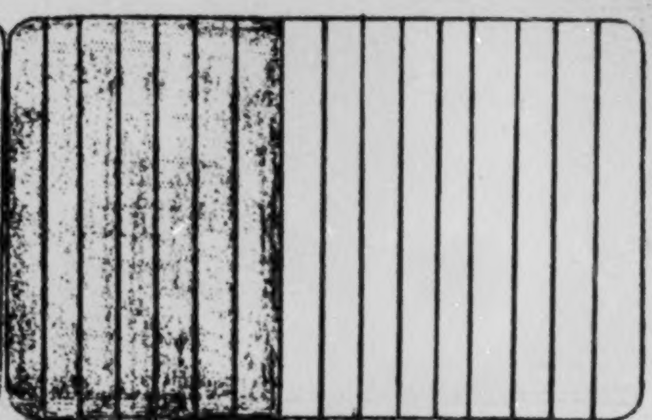
$\frac{4}{9}$

FOUR-NINTHS



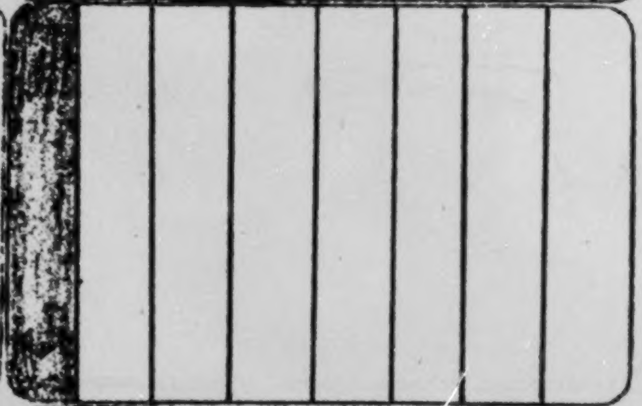
$\frac{7}{16}$

SEVEN-SIXTEENTHS



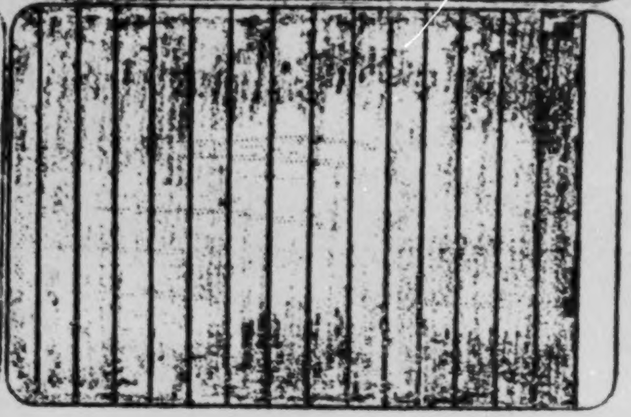
$\frac{1}{8}$

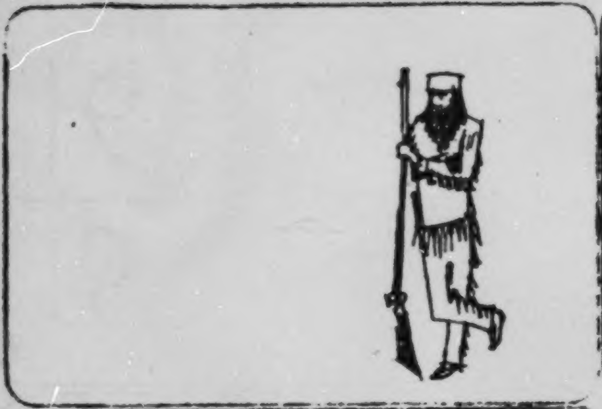
ONE-EIGHTH

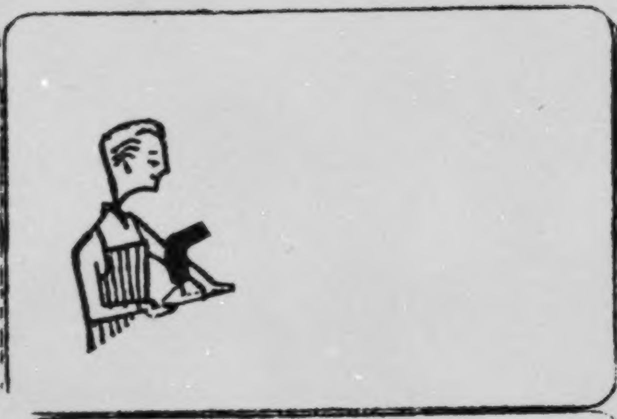


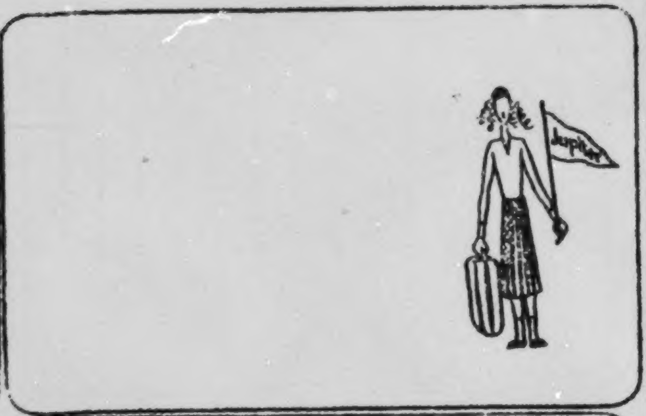
$\frac{15}{16}$

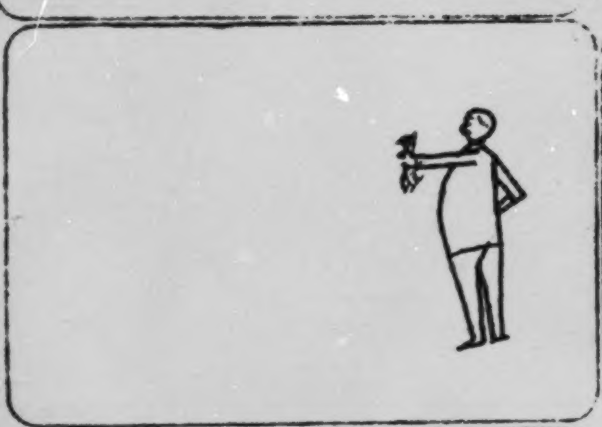
FIFTEEN-SIXTEENTHS

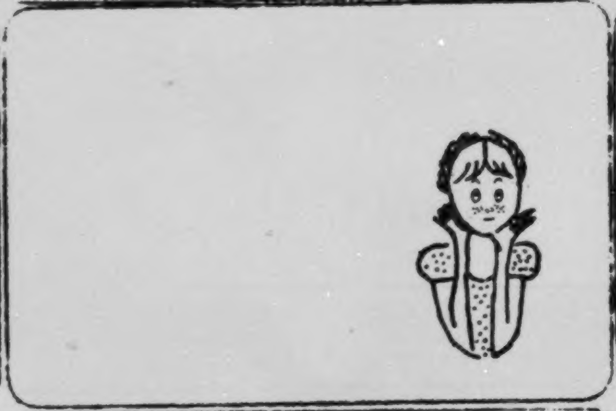


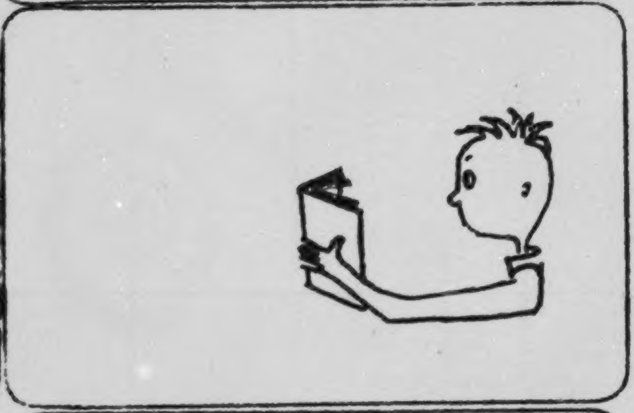


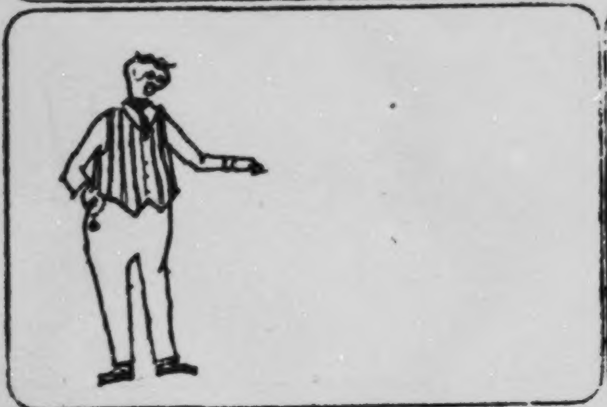


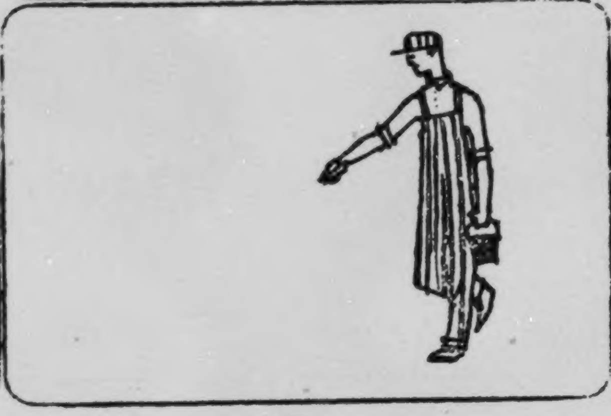

Jupiter

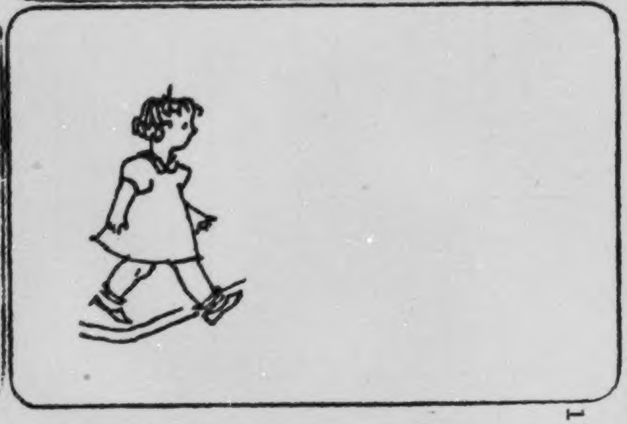












Pupils then make as many correct fraction books as possible containing two orange cards and one blue card. Play continues, with students giving the signal "Over Orange" in turn, until a player goes out.

One point is received for each correct book and two points for going out. The player with the most points wins.

6. Fenced In -- Page L-5

Material(s): Student activity sheet

Method: This activity could be carried out on a geoboard or dotters sheet.

Solution(s):

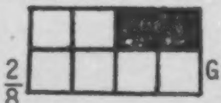
1) $\frac{1}{2}$
2) $\frac{1}{2}$
3) $\frac{1}{4}$
4) $\frac{1}{4}$
5) $\frac{2}{4}$ or $\frac{1}{2}$
6) $\frac{2}{4}$ or $\frac{1}{2}$
7) $\frac{1}{8}$
8) $\frac{1}{8}$
9) $\frac{1}{4}$
10) $\frac{2}{4}$ or $\frac{1}{2}$
11) $\frac{1}{4}$
12) $\frac{2}{4}$ or $\frac{1}{2}$
13) $\frac{1}{4}$
14) $\frac{3}{8}$
15) $\frac{1}{4}$

Note: 13) and 15) are difficult problems. A hint would be to figure out how much is not shaded. This is a very good activity for the geoboard.

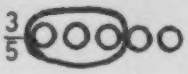
Reference: COLAMBA (1)

Objective II. Given a set of fractions, make a model to represent each fraction.

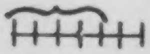
Example: Given $\frac{2}{8}$



Given $\frac{3}{5}$



Given $\frac{4}{6}$



A. SHORT ACTIVITIES

1. Choosing the Correct Part -------------------------------- S-3

Material(s): Student activity sheet

Solution(s):

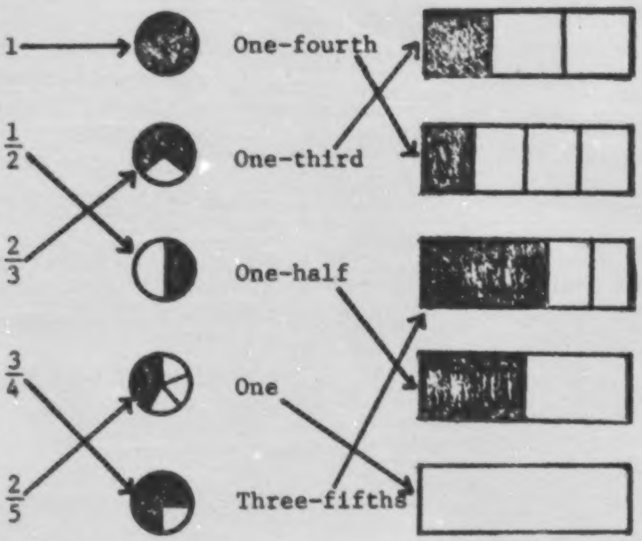
$\frac{1}{4}$ = model 3, 4

$\frac{1}{2}$ = model 1, 2, 3

$\frac{1}{3}$ = model 1, 2

Put an "X" on $\frac{1}{3}$ of them: An "X" on any 3 is correct.

Matching:


1
1/2
2/3
3/4
2/5
One-fourth
One-third
One-half
One
Three-fifths

Reference: COLAMBA (1)

Page

2. Let's Find Parts -- S-4

Material(s): Student activity sheet

Solution(s): $\frac{1}{2}$ = any 2 candy bars

$\frac{1}{3}$ = any 3

$\frac{1}{4}$ = any 2 pop bottles

$\frac{1}{2}$ = any 3 pop bottles

$\frac{2}{3}$ = any 4 △

$\frac{3}{4}$ = any 6 pop bottles

$\frac{2}{5}$ = any 4 ○

$\frac{5}{6}$ = any 5 ⬡

$\frac{3}{5}$ = any 6 □

3. Fill 'er Up -- S-5

Material(s): Student activity sheet

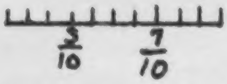
Solution(s): $\frac{1}{2}$ = B $\frac{1}{3}$ = A $\frac{1}{6}$ = D 1 = E $\frac{1}{4}$ = C

B. LAB ACTIVITIES

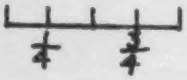
1. Fraction Line-up --- L-6

Material(s): Student activity sheets and rulers

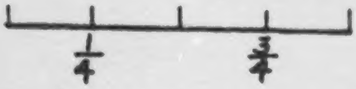
Solution(s): 1. (A)



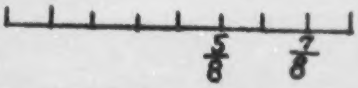
2. (B)



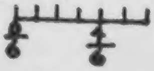
3. (C)



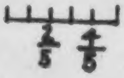
4. (D)



5. (E)



6. (F)



(7. - 13. Each line is six inches.)

7. $\frac{1}{2}$ at 3 inches

8. $\frac{1}{3}$ at 2 inches, $\frac{2}{3}$ at 4 inches

9. $\frac{1}{4}$ at $1\frac{1}{2}$ inches, $\frac{2}{4}$ at 3 inches, $\frac{3}{4}$ at $4\frac{1}{2}$ inches

10. $\frac{1}{6}$ at 1 inch, $\frac{2}{6}$ at 2 inches, $\frac{3}{6}$ at 3 inches, $\frac{4}{6}$ at 4 inches,
$\frac{5}{6}$ at 5 inches

11. $\frac{1}{8}$ at $\frac{3}{4}$ inch, $\frac{2}{8}$ at $1\frac{1}{2}$ inches, $\frac{3}{8}$ at $2\frac{1}{4}$ inches,
$\frac{4}{8}$ at 3 inches, $\frac{5}{8}$ at $3\frac{3}{4}$ inches, $\frac{6}{8}$ at $4\frac{1}{2}$ inches,
$\frac{7}{8}$ at $5\frac{1}{4}$ inches

12. $\frac{1}{12}$ at $\frac{1}{2}$ inch, $\frac{2}{12}$ at 1 inch, $\frac{3}{12}$ at $1\frac{1}{2}$ inches, $\frac{4}{12}$ at 2 inch
$\frac{5}{12}$ at $2\frac{1}{2}$ inches, $\frac{6}{12}$ at 3 inches, $\frac{7}{12}$ at $3\frac{1}{2}$ inches,
$\frac{8}{12}$ at 4 inches, $\frac{9}{12}$ at $4\frac{1}{2}$ inches, $\frac{10}{12}$ at 5 inches,
$\frac{11}{12}$ at $5\frac{1}{2}$ inches

13. Each $\frac{1}{16}$ every $\frac{3}{8}$ of an inch.

Reference: COLAMBA (1)

Page

2. Fence Me In -- L-7

Material(s): Student activity sheet

Method: The student could also do this activity on a geoboard, centigrid or dotter sheet.

Objective III. Write several fractional names for 1 using a different denominator for each.

A. SHORT ACTIVITIES

1. Using the Number Line -- S-6

Material(s): Student activity sheet

Solution(s): 1. 12, $\frac{1}{12}$

2. (C) thirds
   (D) fourths
   (E) sixths
   (F) eighths
   (G) twelfths

3. $\frac{3}{3}$, $\frac{4}{4}$, etc.

B. LAB ACTIVITIES

1. What Does it take to Make One? ------------------------------ L-8

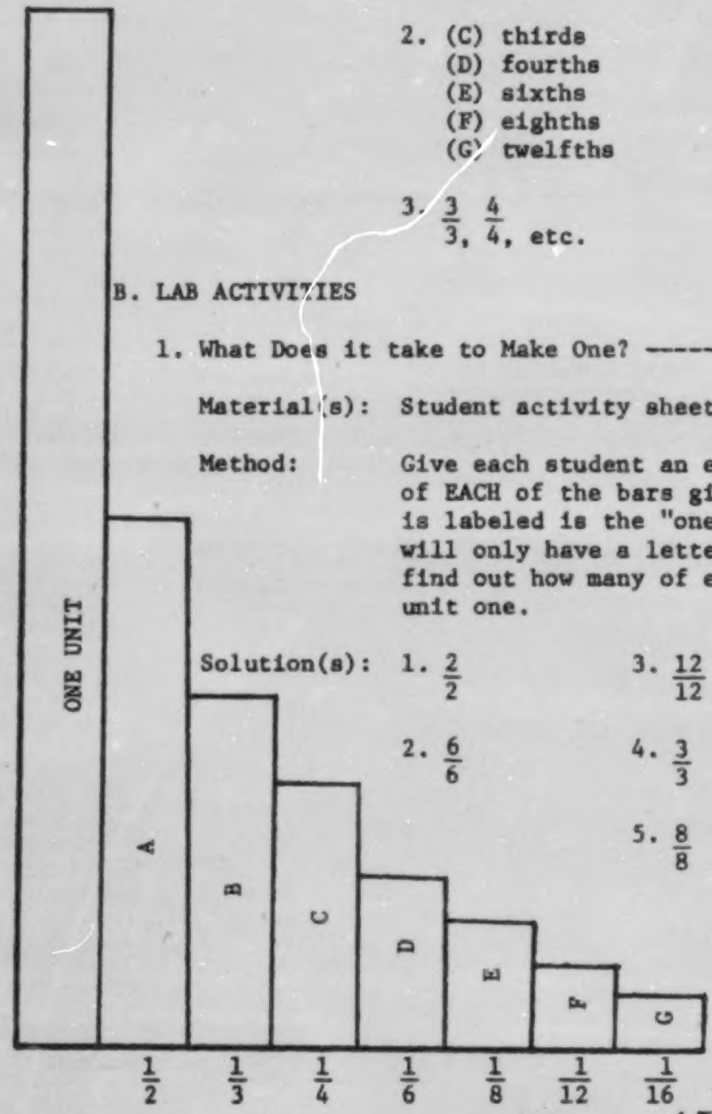
Material(s): Student activity sheet

Method: Give each student an envelope which contains ONE of EACH of the bars given below. The only one that is labeled is the "one unit." Each of the others will only have a letter (A-G) on it. Have the students find out how many of each size it takes to make our unit one.

Solution(s): 1. $\frac{2}{2}$ 3. $\frac{12}{12}$ 6. $\frac{16}{16}$

2. $\frac{6}{6}$ 4. $\frac{3}{3}$ 7. $\frac{4}{4}$

5. $\frac{8}{8}$



Objective IV. Given a list of fractions, rename each by writing a fraction with the least possible denominator.

Example: Rename $\frac{10}{15}$ as $\frac{2}{3}$

A. SHORT ACTIVITIES

Page

1. Making Equal Fractions ---------------------------------- S-7

Material(s): Student activity sheet

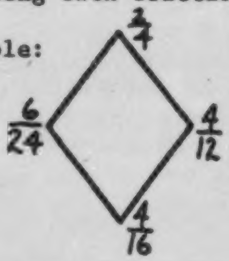
Solution(s):
1. $\frac{2}{5}, \frac{4}{10}$
2. $\frac{4}{8}, \frac{1}{2}$
3. $\frac{2}{6}, \frac{1}{3}$
4. $\frac{4}{6}, \frac{2}{3}$
5. $\frac{6}{8}, \frac{3}{4}$
6. $\frac{6}{16}, \frac{3}{8}$
7. $\frac{2}{4}, \frac{1}{2}$
8. $\frac{8}{12}, \frac{2}{3}$
9. $\frac{2}{3}, \frac{6}{9}$
10. yes

2. Home Run Derby -- S-8

Material(s): Student activity sheet

Method: Draw a baseball diamond on a worksheet (or use student activity sheet). Put a fraction on each base. See if the pupil can make a homerun by reducing each fraction to its lowest term.

Example:



Have pupil put answers on diamonds of the worksheet. The worksheet can be used for several games or at different times.

B. LAB ACTIVITIES

1. Reduce It -- L-9

Material(s): Student activity sheet

Method: Hand out the student activity sheet. Instruct your students to copy down the fraction you write on the chalkboard. Ask them to place your fraction in the heavily outlined box in the upper left hand corner of the nine box square. Next, ask them to find as many equivalent forms of the fraction as possible, placing each new form in a separate box in the square.

It is possible to list an infinite number of equivalent fractions if no restrictions are imposed.

However, it is undesirable at this time to allow fractions whose numerator and denominator are not factors of the original numerator and denominator. In the example below, the fractions $\frac{10}{15}$, $\frac{14}{21}$, $\frac{16}{24}$, $\frac{18}{27}$, $\frac{20}{30}$, and $\frac{22}{33}$ are not allowed because of the above restriction. (See variations.)

This exercise can easily be adapted to a game situation. Award one point for each correct answer. The student scoring the most points is the winner of that game. You may choose to solve several problems, declaring the student with the highest cumulative score the winner. In any case, it is advisable to caution the students that they will not be able to fill all nine boxes for every problem.

Example:

Number written by the teacher:

$\frac{24}{36}$

Solution:

$\frac{24}{36}$	$\frac{12}{18}$	$\frac{8}{12}$
$\frac{6}{9}$	$\frac{4}{6}$	$\frac{2}{3}$

Variations:

1. As an added incentive for your students to look for all possible equivalent fractions under the restrictions imposed, award a bonus of five (5) points for those students who name all such equivalent fractions. In the example above, a student naming all five possible fractions would score ten points. (One each for the five correct equivalent fractions plus the five point bonus.)

2. To increase the scope of the above exercise, allow the students to use any equivalent fraction so long as neither numerator nor denominator is larger than those of the original fraction. (This restriction is necessary to insure a finite number of solutions.) In the example, $\frac{10}{15}$, $\frac{14}{21}$, $\frac{16}{24}$, $\frac{18}{27}$, $\frac{20}{30}$, $\frac{22}{33}$ would be correct answers. However, there are not enough boxes to name all of the possible solutions. Instruct your students to add as many boxes as necessary in order to include all of their solutions.

For your convenience, several sample problems have been listed on the next page together with their solutions. You will note that two solutions have been given. Solution A is for the game suggested in the METHOD and Solution B is for a game according to variation 2.

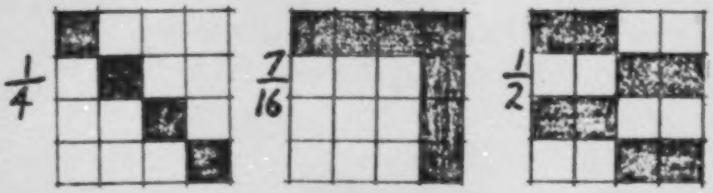
Teacher's Number	Solution A	Solution B
$\frac{12}{16}$	$\frac{6}{8}$, $\frac{3}{4}$	$\frac{3}{4}$, $\frac{6}{8}$, $\frac{9}{12}$
$\frac{20}{32}$	$\frac{10}{16}$, $\frac{5}{8}$	$\frac{5}{8}$, $\frac{10}{16}$, $\frac{15}{24}$
$\frac{16}{36}$	$\frac{8}{18}$, $\frac{4}{9}$	$\frac{4}{9}$, $\frac{8}{18}$, $\frac{12}{27}$
$\frac{48}{20}$	$\frac{24}{10}$, $\frac{12}{5}$	$\frac{12}{5}$, $\frac{24}{10}$, $\frac{36}{15}$
$\frac{45}{50}$	$\frac{9}{10}$	$\frac{9}{10}$, $\frac{18}{20}$, $\frac{27}{30}$, $\frac{36}{40}$
$\frac{72}{24}$	$\frac{36}{12}$, $\frac{24}{8}$, $\frac{18}{6}$, $\frac{12}{4}$, $\frac{9}{3}$,	$\frac{3}{1}$, $\frac{6}{2}$, $\frac{9}{3}$, $\frac{12}{4}$, $\frac{15}{5}$, $\frac{18}{6}$, $\frac{21}{7}$, $\frac{24}{8}$, $\frac{27}{9}$, $\frac{30}{10}$, $\frac{33}{11}$,
	$\frac{6}{2}$, $\frac{3}{1}$	$\frac{39}{13}$, $\frac{42}{14}$, $\frac{45}{15}$, $\frac{48}{16}$, $\frac{51}{17}$, $\frac{54}{18}$, $\frac{57}{19}$, $\frac{60}{20}$, $\frac{63}{21}$, $\frac{66}{22}$, $\frac{69}{23}$
$\frac{25}{125}$	$\frac{5}{25}$, $\frac{1}{5}$	$\frac{1}{5}$, $\frac{2}{10}$, $\frac{3}{15}$, $\frac{4}{20}$, $\frac{5}{25}$, $\frac{6}{30}$, $\frac{7}{35}$, $\frac{8}{40}$, $\frac{9}{45}$, $\frac{10}{50}$, $\frac{11}{55}$,
		$\frac{12}{60}$, $\frac{13}{65}$, $\frac{14}{70}$, $\frac{15}{75}$, $\frac{16}{80}$, $\frac{17}{85}$, $\frac{18}{90}$, $\frac{19}{95}$, $\frac{20}{100}$, $\frac{21}{105}$, $\frac{22}{110}$,
		$\frac{23}{115}$, $\frac{24}{120}$
$\frac{192}{72}$	$\frac{96}{36}$, $\frac{64}{24}$, $\frac{48}{18}$, $\frac{32}{12}$, $\frac{24}{9}$,	$\frac{8}{3}$, $\frac{16}{6}$, $\frac{24}{9}$, $\frac{32}{12}$, $\frac{40}{15}$, $\frac{48}{18}$, $\frac{56}{21}$, $\frac{64}{24}$, $\frac{72}{27}$, $\frac{80}{30}$, $\frac{88}{33}$,
	$\frac{16}{6}$, $\frac{8}{3}$	$\frac{96}{36}$, $\frac{104}{39}$, $\frac{112}{42}$, $\frac{120}{45}$, $\frac{128}{48}$, $\frac{136}{51}$, $\frac{144}{54}$, $\frac{152}{57}$, $\frac{160}{60}$
		$\frac{168}{63}$, $\frac{176}{66}$, $\frac{184}{69}$

Reference: GIMMICKS(2)

2. Fraction Fun -- Page L-10

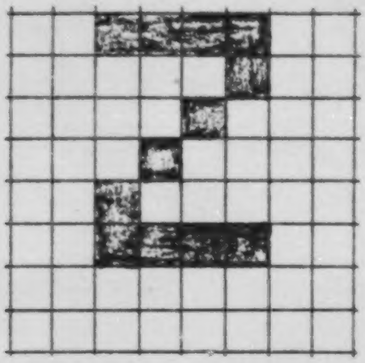
Material(s): Student activity sheet and graph paper

Method: Shade graph paper cut to contain 16 or 64 squares so that various fractional amounts of the total square are shaded. Some of the variations you might use are shown on the next page. These may be duplicated and passed to the students who are to write in lowest terms the fraction represented by the shaded part.



The game may be varied by asking pupils to shade graph paper to show various fractional amounts in different forms. For example, in the illustration below, pupils are asked to make a "Z" by shading three sixteenths of the rectangle.

$\frac{12}{64} = \frac{3}{16}$



Solution(s): Solutions will vary according to the fractions chosen.

Page

3. Back and Forth -- None

Material(s): None

Method: Divide the class into teams and line them up facing each other. Start the game by giving the fraction $\frac{1}{16}$. The first student on team A is to give the fraction $\frac{1}{16}$ larger ($\frac{2}{16}$), but in lowest terms if it can be reduced ($\frac{1}{8}$). Then, the first member of Team B gives $\frac{3}{16}$ and this continues back and forth from team to team as pupils give $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, ...$\frac{15}{16}$, 1. After the fractions for sixteenths have been completed, move on to tenths, eights, sixths, fifths, fourths, thirds, and, finally, halves. A score keeper should register one point each for the correct responses made by each team. The team with the most points wins.

Each team is responsible for correcting any error. If the responding team corrects the error they receive a point as if their team member had responded correctly. If the opposing team corrects the error first they receive the point. This in no way affects the order of play. Solutions will vary with fractions chosen.

Objective V. Given a list of fractions, rename each by writing a fraction with a greater denominator.

Example: Rename $\frac{2}{3}$ as $\frac{6}{9}$

A. SHORT ACTIVITIES — Page

1. Equivalent Fractions -- S-9

Material(s): Student activity sheet

Solution(s):

1. $\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \frac{5}{15}, \frac{6}{18}$

2. $\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}, \frac{18}{24}$

3. $\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \frac{10}{25}, \frac{12}{30}$

4. $\frac{3}{8}, \frac{6}{16}, \frac{9}{24}, \frac{12}{32}, \frac{15}{40}, \frac{18}{48}$

All fractions in each row are equal.

B. LAB ACTIVITIES

Objective VI. Given a list of mixed numerals, rename each by writing an improper fraction.

Example: Given $4\frac{2}{3}$ Write $\frac{14}{3}$

A. SHORT ACTIVITIES

1. Writing Mixed Numerals -- S-10

Material(s): Student activity sheet

Solution(s):

a) 5	f) $\frac{1}{4}$
b) 22	g) 65
c) 29	h) 9
d) 5	i) 151
e) 13	j) $7\frac{3}{12}$

B. LAB ACTIVITIES

1. Let's Write Improper Fractions and Mixed Numbers ----------- L-11

Material(s): Student activity sheet

Solution(s):

1. $3\frac{3}{5} = \frac{18}{5}$
2. $2\frac{3}{8} = \frac{19}{8}$
3. $5\frac{3}{4} = \frac{23}{4}$
4. $1 + \frac{3}{4} = 1\frac{3}{4}$
5. $\frac{7}{4}$
6. B. $2\frac{2}{4} = \frac{10}{4}$ or $2\frac{1}{2} = \frac{5}{2}$
   C. $\frac{2}{1} = \frac{8}{4}$
   D. $3\frac{1}{4} = \frac{13}{4}$
   E. $4\frac{3}{4} = \frac{19}{4}$
   F. $4\frac{1}{4} = \frac{17}{4}$
   G. $\frac{4}{1} = \frac{16}{4}$
   H. $1\frac{1}{4} = \frac{5}{4}$
   I. $\frac{1}{1} = \frac{4}{4}$

Reference: COLAMBA (1)

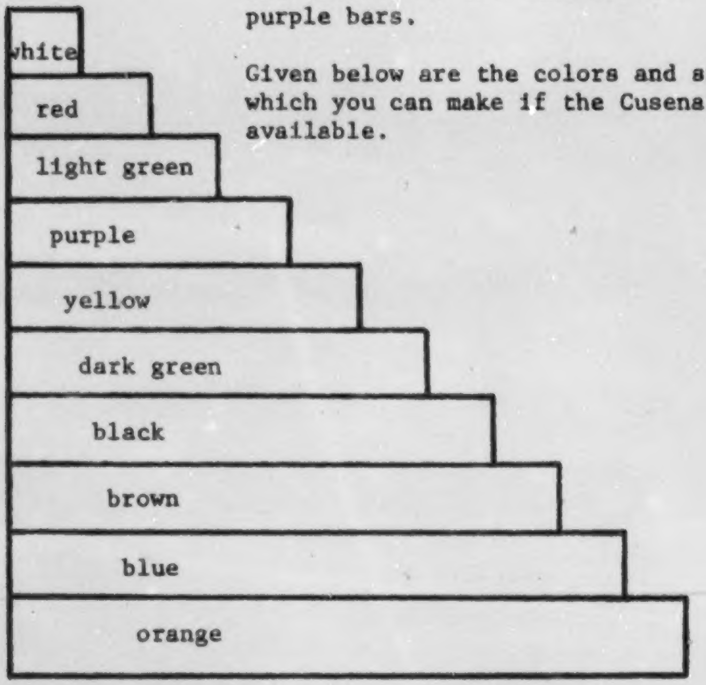
Page

2. We Make Improper and Mixed Fractions -------------------- L-12

Material(s): Use Cusenaire rods if they are available, however, this activity can be performed using string or construction paper and the student activity sheet.

Method: Choose the red block as the "one unit." (Below.) Have students write both as improper fractions and mixed numbers for the blocks larger than the red block. Do the same for the light green, and purple bars.

Given below are the colors and sizes of the bars which you can make if the Cusenaire Rods are not available.



Solution(s): 1)

COLOR	IMPROPER FRACTION	MIXED NUMBER
1. light green	$\frac{3}{2}$	$1\frac{1}{2}$
2. purple	$\frac{4}{2}$ or $\frac{2}{1}$	2
3. yellow	$\frac{5}{2}$	$2\frac{1}{2}$
4. dark green	$\frac{6}{2}$ or $\frac{3}{1}$	3
5. black	$\frac{7}{2}$	$3\frac{1}{2}$
6. brown	$\frac{8}{2}$ or $\frac{4}{1}$	4
7. blue	$\frac{9}{2}$	$4\frac{1}{2}$
8. orange	$\frac{10}{2}$ or $\frac{5}{1}$	5

2)

1. purple	$\frac{4}{3}$	$1\frac{1}{3}$
2. yellow	$\frac{5}{3}$	$1\frac{2}{3}$
3. dark green	$\frac{6}{3}$ or $\frac{2}{1}$	2
4. black	$\frac{7}{3}$	$2\frac{1}{3}$
5. brown	$\frac{8}{3}$ or $\frac{3}{1}$	$2\frac{2}{3}$
6. blue	$\frac{9}{3}$	3
7. orange	$\frac{10}{3}$	$3\frac{1}{3}$

3)

1. yellow	$\frac{5}{4}$	$1\frac{1}{4}$
2. dark green	$\frac{6}{4}$ or $\frac{3}{2}$	$1\frac{2}{4}$ or $1\frac{1}{2}$
3. black	$\frac{7}{4}$	$1\frac{3}{4}$
4. brown	$\frac{8}{4}$ or $\frac{2}{1}$	2
5. blue	$\frac{9}{4}$	$2\frac{1}{4}$
6. orange	$\frac{10}{4}$ or $\frac{5}{2}$	$2\frac{2}{4}$ or $2\frac{1}{2}$

Objective VII. Given a list of improper fractions, rename each by writing a mixed numeral.

Example: Given $\frac{4}{3}$ write $1\frac{1}{3}$

A. SHORT ACTIVITIES — Page

1. Fractions Greater Than One ---------------------------------- S-11

Material(s): Student activity sheet

Solution(s): Example: $\frac{\boxed{10}}{3}$

1. $\frac{\boxed{7}}{\boxed{4}}$ $\underline{1} + \underline{\frac{3}{4}}$
2. $\frac{\boxed{15}}{\boxed{6}}$ $\underline{2} + \underline{\frac{3}{6}}$
3. $\frac{\boxed{5}}{\boxed{2}}$ $\underline{2} + \underline{\frac{1}{2}}$
4. $\frac{\boxed{18}}{\boxed{7}}$ $\underline{2} + \underline{\frac{4}{7}}$
5. $\underline{8} = \underline{2}$
6. $\underline{6} = \frac{\boxed{6}}{\boxed{3}} = \underline{2}$
7. $\underline{16}, \frac{\boxed{16}}{\boxed{4}} = \underline{4}$
8. $\underline{10}, \frac{\boxed{10}}{5}, = \underline{2}$

Page

2. Finding Mixed Numbers ------------------------------------ S-12

Material(s): Student activity sheet

Solution(s): 1. $1 + \frac{3}{4} = 1\frac{3}{4}$

2. A. $1\frac{3}{4}$	$1 + \frac{3}{4}$
B. $2\frac{1}{2}$	$2 + \frac{1}{2}$
C. 2	2
D. $3\frac{1}{4}$	$3 + \frac{1}{4}$
E. $4\frac{3}{4}$	$4 + \frac{3}{4}$
F. $4\frac{1}{4}$	$4 + \frac{1}{4}$
G. 4	$4 + \frac{0}{4}$
H. 0	$0 + \frac{3}{4}$
I. 1	$1 + \frac{0}{4}$

B. LAB ACTIVITIES

1. Making Fractions From A Number Line -------------------- L-13

Material(s): Student activity sheet

Solution(s): 1. A. $\frac{5}{6}$

B. $1\frac{1}{6}$ or $\frac{7}{6}$

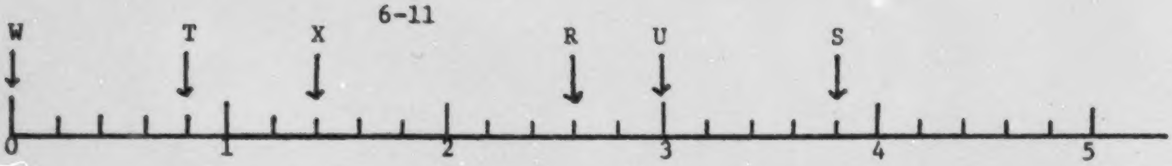
C. 2 or $\frac{12}{6}$

D. $2\frac{4}{6}$ or $2\frac{2}{3}$ or $\frac{16}{6}$ or $\frac{8}{3}$

E. $3\frac{3}{6}$ or $3\frac{1}{2}$ or $\frac{21}{6}$ or $\frac{7}{2}$

F. $3\frac{5}{6}$ or $\frac{23}{6}$

2. $1\frac{4}{5} = \frac{9}{5}$
3. $\frac{3}{5}$
4. $4\frac{1}{5}$ or $\frac{21}{5}$
5. 1 or $\frac{5}{5}$
6-11

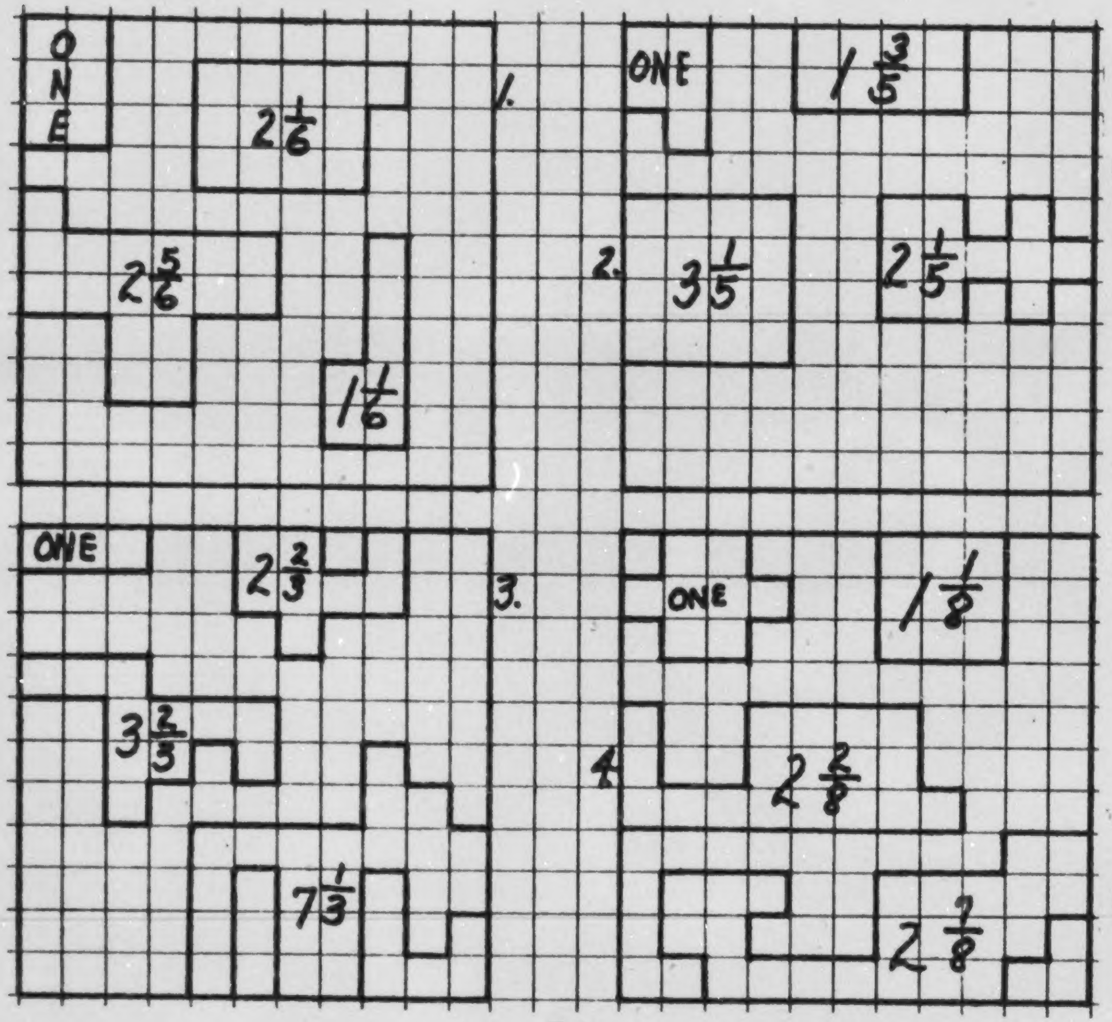

W
T
X
R
U
S
0
1
2
3
4
5

Reference: COLAMBA (1)

2. Sum for Mixed Numbers ------------------------------------ Page L-14

Material(s): Student activity sheet

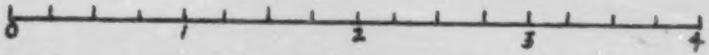
Solution(s):


ONE
$2\frac{1}{6}$
1.
$2\frac{5}{6}$
$1\frac{1}{6}$
ONE
$1\frac{3}{5}$
2.
$3\frac{1}{5}$
$2\frac{1}{5}$
ONE
$2\frac{2}{3}$
3.
$3\frac{2}{3}$
$7\frac{1}{3}$
ONE
$1\frac{1}{8}$
4.
$2\frac{2}{8}$
$2\frac{7}{8}$

3. Improper Fractions -- Page L-15

Material(s): Student activity sheet and ruler

Solution(s): 1.



a. $\frac{4}{4}$ h. $\frac{11}{4}$

b. $\frac{5}{4}$ i. $\frac{12}{4}$

c. $\frac{6}{4}$ j. $\frac{13}{4}$

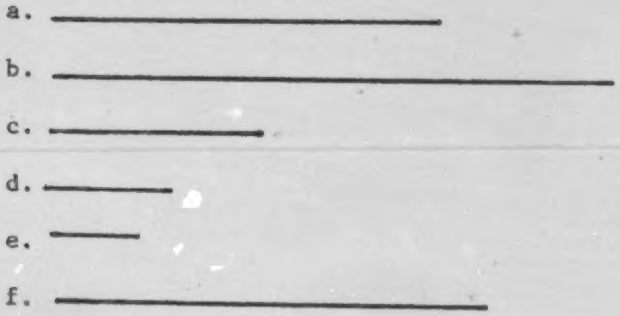
d. $\frac{7}{4}$ k. $\frac{13}{4}$

e. $\frac{8}{4}$ l. $\frac{15}{4}$

f. $\frac{9}{4}$

g. $\frac{10}{4}$

2.



3. $\frac{6}{5}$", $\frac{15}{11}$", $\frac{14}{12}$", $\frac{9}{8}$", $\frac{5}{4}$", $\frac{11}{5}$", $\frac{11}{10}$"

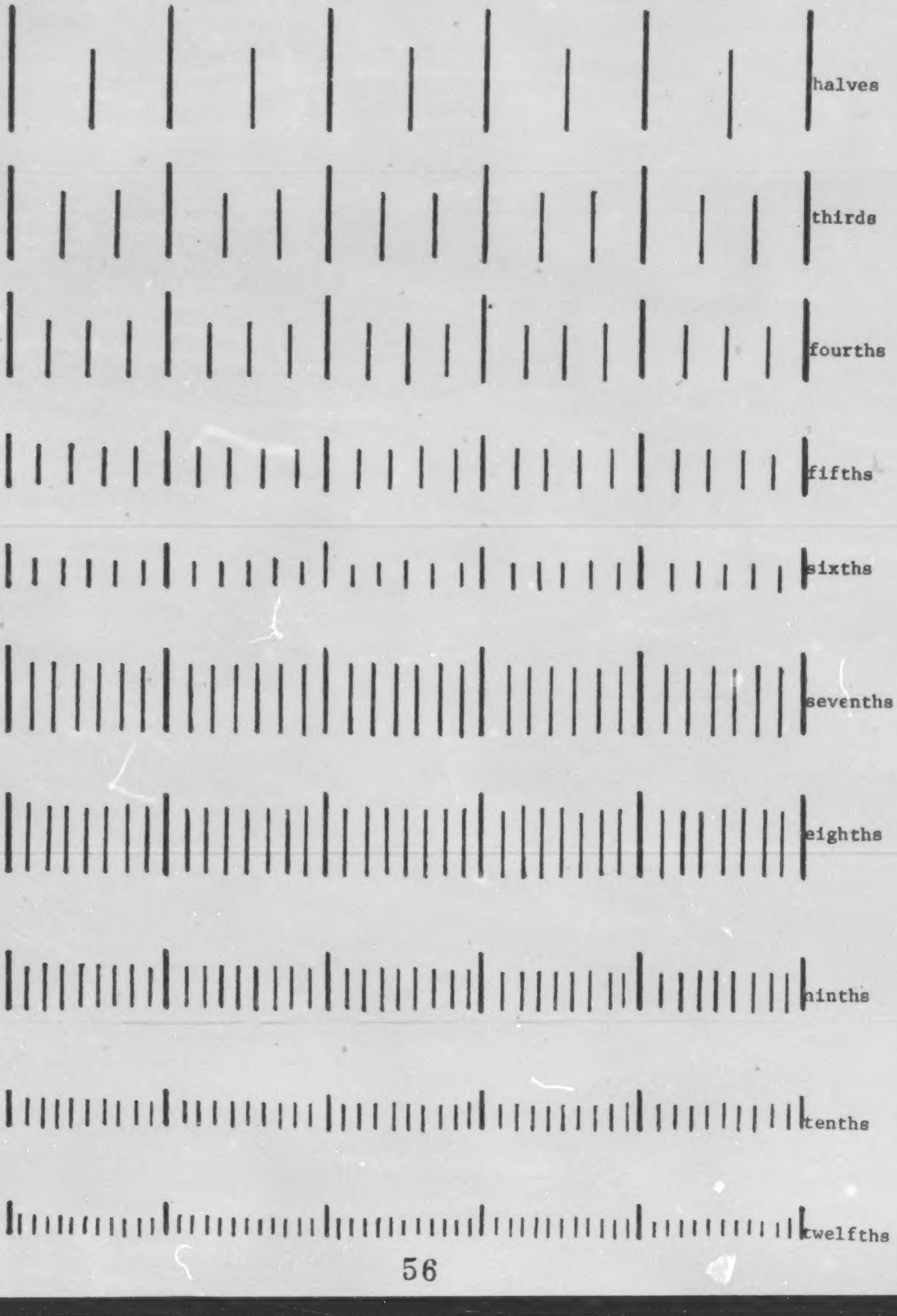
4.

	FRACTION	NUMERATOR	DENOMINATOR	PROPER OR IMPROPER
a.	$\frac{3}{4}$	3	4	P
b.	$\frac{7}{3}$	7	3	I
c.	$\frac{9}{8}$	9	8	I
d.	$\frac{5}{6}$	5	6	P
e.	$\frac{4}{3}$	4	3	I

4. Number Lines and Fractions ---------------------------------- L-16

Material(s): Student activity sheet and master sheet (following page). Prepare the strips from the master sheet, using transparencies, if possible. (Ditto copies are satisfactory.) Each student will need a set of strips and one or more pages of number lines.

MASTER FOR STRIPS


halves
thirds
fourths
fifths
sixths
sevenths
eighths
ninths
tenths
twelfths

Method: Any problem involving the included denominators is suitable for solution. For example:

"Change $\frac{16}{5}$ to a mixed number."

Place the strip for "5ths" on the number line. Count sixteen fifths from zero and mark a point on the number line. This point should be between 3 and 4. Write the coordinate of this point as a mixed number by counting the number of fifths from "3" to the point.

Select for each lesson a small set of exercises involving the furnished denominators. Allow pupils ample time to manipulate the materials and to thoroughly understand the results.

Reference: Math Round-Up (5)

Objective VIII. Given an ordered pair of fractions, write the first as greater than, less than, or equal to the second. Use the symbols <, >, or =.

Example: Given $\frac{2}{3}$, $\frac{2}{5}$, write $\frac{2}{3} > \frac{2}{5}$.

A. SHORT ACTIVITIES Page

1. How Much Is Shaded? -- S-13

Material(s): Student activity sheet

Solution(s): 1. $\frac{2}{3}$ 2. $\frac{1}{2}$ 3. $\frac{2}{5}$ 4. $\frac{2}{8}$ 5. $\frac{2}{6}$

6. $\frac{2}{8} < \frac{2}{6} < \frac{2}{5} < \frac{1}{2} < \frac{2}{3}$

B. LAB ACTIVITIES

1. Comparing Fractional Numerals ------------------------------ L-17

Material(s): Student activity sheet

Method: Have pupils read the directions. The entire class, smaller groups or pupils by themselves may then work out and discuss the problems. Various methods of comparing fractions should be discussed and a number line divided into appropriate fractional parts be provided.

Solution(s):

	CIRCLE	SQUARE	TRIANGLES
1.	$\frac{1}{5}$	$\frac{5}{5}$	none
2.	$\frac{1}{8}$	$\frac{6}{8}$	none

	CIRCLE	SQUARE	TRIANGLES
3.	$\frac{1}{7}$	$\frac{7}{7}$	none
4.	$\frac{3}{12}$	$\frac{11}{12}$	none
5.	$\frac{2}{12}$	$\frac{4}{6}$	$\frac{6}{12}$, $\frac{3}{6}$
6.	$\frac{1}{4}$	$\frac{2}{2}$	$\frac{1}{2}$, $\frac{2}{4}$
7.	$\frac{2}{12}$	$\frac{10}{12}$	$\frac{8}{12}$, $\frac{4}{6}$
8.	$\frac{3}{9}$	$\frac{7}{9}$	$\frac{2}{3}$, $\frac{6}{9}$
9.	$\frac{1}{6}$	$\frac{5}{6}$	$\frac{2}{3}$, $\frac{4}{6}$
10.	$\frac{2}{10}$	$\frac{4}{5}$	none
11.	$\frac{1}{12}$	$\frac{1}{1}$	none
12.	$\frac{1}{3}$	$\frac{5}{6}$	$\frac{2}{3}$, $\frac{8}{12}$, $\frac{4}{6}$
13.	$\frac{3}{12}$	$\frac{3}{4}$	none
14.	$\frac{4}{12}$	$\frac{3}{4}$	$\frac{2}{3}$, $\frac{8}{12}$
15.	$\frac{3}{8}$	$\frac{7}{8}$	none
16.	$\frac{1}{7}$	$\frac{6}{7}$	none
17.	$\frac{3}{8}$	$\frac{7}{9}$	none
18.	$\frac{2}{5}$	$\frac{9}{10}$	none
19.	$\frac{2}{10}$	$\frac{3}{5}$	none
20.	$\frac{2}{9}$	$\frac{9}{10}$	none
21.	$\frac{3}{16}$	$\frac{5}{6}$	none
22.	$\frac{2}{9}$	$\frac{11}{12}$	none
23.	$\frac{3}{10}$	$\frac{8}{9}$	none
24.	$\frac{3}{12}$	$\frac{6}{7}$	none
25.	$\frac{3}{10}$	$\frac{4}{9}$	none

Reference: Math Round-Up (5)

2. Y Cross Multiply? -- Page L-18

Material(s): Student activity sheet

Solution(s): 1. no 24 ≠ 27

2. yes $48 = 48$
3. yes $270 = 270$
4. no $792 \neq 660$
5. yes $112 = 112$
6. yes $90 = 90$

Reference: West Palm Beach (6)

Page

3. Rename for Order -- L-19

Material(s): Student activity sheet

Solution(s):

1. $\frac{3}{6}, \frac{2}{6}$ $\frac{3}{6} > \frac{2}{6}$ $\frac{1}{2} > \frac{1}{3}$

2. $\frac{15}{40}, \frac{16}{40}$ $\frac{15}{40} < \frac{16}{40}$ $\frac{3}{8} < \frac{2}{5}$

3. $\frac{3}{12}, \frac{4}{12}$ $\frac{3}{12} < \frac{4}{12}$ $\frac{1}{4} < \frac{1}{3}$

4. $\frac{6}{8}, \frac{4}{8}$ $\frac{6}{8} > \frac{4}{8}$ $\frac{3}{4} > \frac{1}{2}$

Part II:

5. $\frac{20}{30}, \frac{18}{30}, \frac{15}{30}$

$\frac{15}{30}$ $\frac{18}{30}$ $\frac{20}{30}$

$\frac{1}{2}$ $\frac{3}{5}$ $\frac{2}{3}$

6. $\frac{70}{84}, \frac{72}{84}, \frac{63}{84}$

$\frac{63}{84}$ $\frac{70}{84}$ $\frac{72}{84}$

$\frac{3}{4}$ $\frac{5}{6}$ $\frac{6}{7}$

7. $\frac{6}{12}, \frac{8}{12}, \frac{9}{12}$

$\frac{1}{2}$ $\frac{2}{3}$ $\frac{9}{12}$

8. $\frac{10}{12}, \frac{4}{12}, \frac{9}{12}$

$\frac{4}{12}$ $\frac{9}{12}$ $\frac{10}{12}$

$\frac{4}{12}$ $\frac{9}{12}$ $\frac{5}{6}$

Reference: West Palm Beach (6)

4. Cut for Order -- L-20

Material(s): Student activity sheet and scissors

Method: Cut out rectangles and circles and answer the questions.

Solution(s): 1.
a. >
b. <
c. >
d. =
e. <
f. >
g. =
h. >

2. a. $\frac{1}{6} < \frac{2}{7} < \frac{1}{3} < \frac{1}{2} < \frac{2}{3} < \frac{3}{4}$

b. $\frac{1}{3} < \frac{1}{5} + \frac{2}{5} < \frac{1}{3} + \frac{1}{3} < \frac{1}{2} + \frac{1}{3}$

Reference: SRA, 5th Grade Text (7)

Objective IX. Given a list of pairs of fractions, each pair having equal denominators and each pair having either the (+) or the (-) operational sign, the learner can perform the operation indicated and rewrite the sum or the difference in its simplest form.

Examples: Given $\frac{1}{5} + \frac{2}{5}$, write $\frac{3}{5}$ as the sum.

Given $\frac{3}{8} - \frac{1}{8}$, write $\frac{1}{4}$ as the difference.

A. SHORT ACTIVITIES | Page

1. Adding With Models and Number Line ------------------------ S-14

Material(s): Student activity sheet

Solution(s):
1. $1\frac{1}{3} + \frac{1}{3} = 1\frac{2}{3}$
2. $1\frac{1}{2} + 1 = 2\frac{1}{2}$
3. $1\frac{3}{4} + 1\frac{1}{4} = 3$
4. $1 + 3 = 4$
5. $1\frac{1}{2} + 1\frac{1}{4} = 1\frac{3}{4}$

Reference: West Palm Beach (6)

2. Fractional Units -- None

Material(s): Flash cards containing fractions. Cards included for game "Over Orange" can be used.

Method: Make out a series of flash cards containing fractions. Divide the class into teams. As you show each fraction, a member from one team must tell its fractional unit and give a fraction that is larger than the one shown, but having the same fractional unit. For example, if you show the card $\frac{2}{3}$, the pupil might say, "The fractional unit is $\frac{1}{3}$.

A larger fraction with the same fractional unit is $\frac{4}{3}$." Points are received for correct answers and the team with the most points wins.

3. Find the Magic Squares ------------------------------------ S-15

Material(s): Student activity sheet

Solution(s): 1, 3, 5 and 6 are magic.

Page

4. Adding for Magic -- S-16

Material(s): Student activity sheet

Solution(s): Sum = $26\frac{1}{4}$

$11\frac{3}{4}$	$4\frac{3}{4}$	$9\frac{3}{4}$
$6\frac{3}{4}$	$8\frac{3}{4}$	$10\frac{3}{4}$
$7\frac{3}{4}$	$12\frac{3}{4}$	$5\frac{3}{4}$

5. Subtracting Like Fractions -------------------------------- S-17

Material(s): Student activity sheet

Solution(s): 1. 1 fourth $\frac{1}{4}$, 1 third $\frac{1}{3}$, 2 sevenths $\frac{2}{7}$

2. $\frac{2}{5}$, $\frac{1}{6}$, $\frac{3}{9}$, $\frac{3}{8}$, $\frac{1}{6}$, $\frac{5}{16}$, $\frac{5}{9}$, $\frac{4}{16}$, $\frac{7}{12}$

6. Subtracting Fractions ------------------------------------- S-18

Material(s): Student activity sheet

Solution(s):

1. $2\frac{3}{4}$
2. $2\frac{3}{4}$
3. $2\frac{4}{6}$
4. $4\frac{2}{4}$
5. $2\frac{2}{4}$
6. $1\frac{4}{8}$
7. $2\frac{6}{8}$
8. $2\frac{2}{6}$

7. More Subtracting Fractions -------------------------------- S-19

Material(s): Student activity sheet

Solution(s):

1. $1\frac{1}{2}$
2. $2\frac{3}{4}$
3. $2\frac{5}{8}$
4. $1\frac{2}{5}$
5. $4\frac{3}{10}$

8. Even More Subtracting Fractions -------------------------- S-20

Material(s): Student activity sheet

Solution(s):

1. $2\frac{2}{4}$
2. $\frac{4}{8}$
3. $2\frac{2}{6}$

B. LAB ACTIVITIES

1. Bound to Add -- L-21

Material(s): Student activity sheet

Solution(s):

1. $\frac{2}{4}$
2. $\frac{3}{4}$
3. $\frac{4}{4}$
4. $\frac{4}{8}$
5. $\frac{7}{8}$
6. $\frac{2}{2}$
7. $\frac{2}{8}$
8. $\frac{4}{8}$
9. $\frac{5}{8}$
10. $\frac{2}{4}$
11. $\frac{2}{3}$
12. 1
13. $\frac{5}{6}$
14. $\frac{5}{6}$
15. $\frac{3}{12}$
16. $\frac{2}{6}$
17. $\frac{4}{6}$
18. $\frac{3}{12}$
19. $\frac{5}{6}$

This is a good geoboard activity.

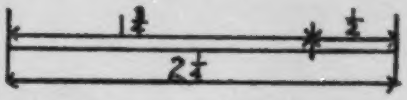
Reference: COLAMBA (1)

2. Subtracting Mixed Numbers ---------------------------------- Page L-22

Material(s): Student activity sheet (if expanded upon, will need ruler)

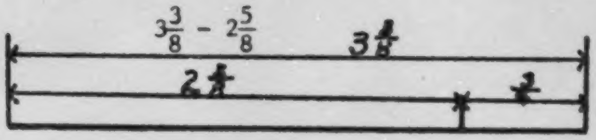
Method: This lab activity can be carried forward by giving the students problems with fourths, eighths, and sixteenths and have them find the answers on a ruler.

Example: $2\frac{1}{4} - 1\frac{3}{4}$



$= \frac{1}{2}$

$3\frac{3}{8} - 2\frac{5}{8}$

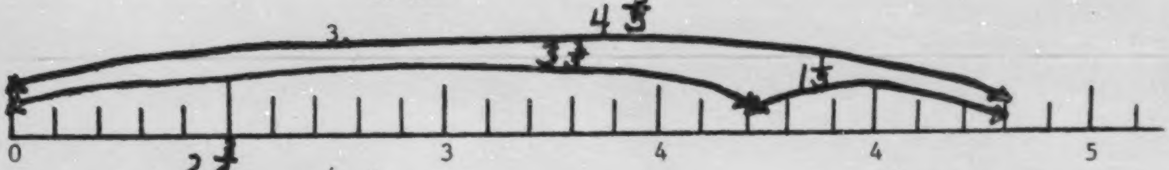


$= \frac{3}{4}$

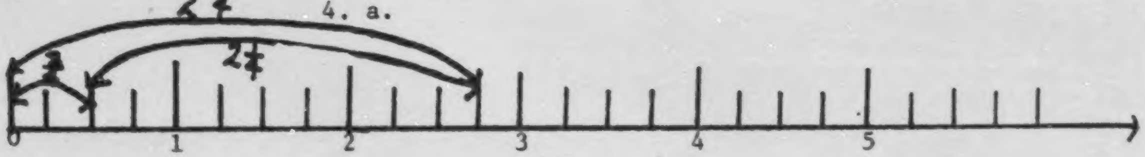
Solution(s):

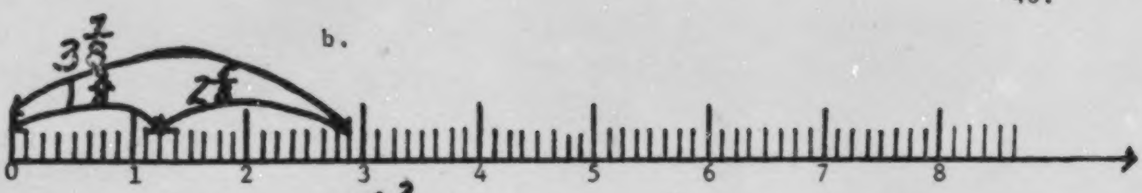
1. $2\frac{1}{6}$
2. a. $\frac{2}{4}$
   b. $1\frac{2}{8}$
   c. 3

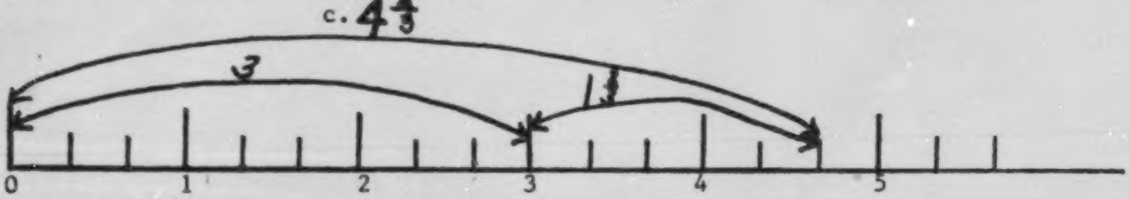
3.



4. a.







Reference: COLAMBA (1)

3. More Fences -- Page L-23

Material(s): Student activity sheets

Method: This activity may also be done on a geoboard.

Solution(s):

I1. $\frac{1}{2} - \frac{1}{2} = 0$
2. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$
3. $\frac{5}{8} - \frac{3}{8} = \frac{2}{8}$
4. $\frac{6}{16} - \frac{2}{16} = \frac{4}{16}$
5. $\frac{2}{2} - \frac{1}{2} = \frac{1}{2}$
6. $\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$
7. $\frac{7}{8} - \frac{4}{8} = \frac{3}{8}$
8. $\frac{4}{8} - \frac{1}{8} = \frac{3}{8}$

II1. $\frac{4}{12} - \frac{4}{4} = 0$
2. $\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$
3. $1 - \frac{1}{6} = \frac{5}{6}$
4. $1 - \frac{6}{12} = \frac{6}{12}$
5. $\frac{1}{6} - \frac{4}{24} = 0$
6. $1 - \frac{2}{6} = \frac{4}{6}$
7. $\frac{3}{6} - \frac{1}{6} = \frac{2}{6}$
8. $\frac{1}{2} - \frac{1}{12} = \frac{5}{12}$

III1. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$
2. $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$
3. $\frac{5}{8} - \frac{5}{8} = \frac{0}{8}$
4. $\frac{2}{2} - \frac{1}{2} = \frac{1}{2}$
5. $\frac{5}{4} - \frac{2}{4} = \frac{3}{4}$
6. $1 - \frac{1}{2} = \frac{1}{2}$
7. $\frac{5}{8} - \frac{3}{8} = \frac{2}{8}$
8. $\frac{6}{16} - \frac{4}{16} = \frac{2}{16}$
9. $\frac{4}{4} - \frac{3}{4} = \frac{1}{4}$
10. $\frac{7}{8} - \frac{2}{8} = \frac{5}{8}$

IV1. $\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$
2. $\frac{4}{3} - \frac{4}{6} = \frac{4}{6} = \frac{2}{3}$
3. $1\frac{1}{3} - \frac{1}{6} = 1\frac{1}{6}$
4. $\frac{2}{3} - \frac{3}{6} = \frac{1}{6}$
5. $\frac{4}{6} - \frac{1}{3} = \frac{1}{3}$
6. $2 - \frac{2}{3} = 1\frac{1}{3}$
7. $1 - \frac{1}{3} = \frac{2}{3}$
8. $1 - \frac{2}{3} = \frac{1}{3}$
9. $\frac{1}{3} - \frac{1}{3} = 0$
10. $\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$

V. 1. $\frac{3}{12} - \frac{2}{12} = \frac{1}{12}$

2. $\frac{3}{12} - \frac{2}{12} = \frac{1}{12}$

3. $\frac{5}{6} - \frac{3}{12} = \frac{7}{12}$

4. $\frac{7}{12} - \frac{4}{12} = \frac{3}{12}$

5. $1 - \frac{1}{2} = \frac{1}{2}$

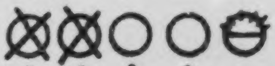
6. $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$

Reference: COLAMBA (1)

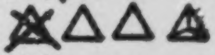
4. Picture Subtraction -- Page L-24

Material(s): Student activity sheet

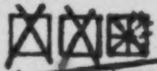
Solution(s): 1. a. $2\frac{1}{2}$



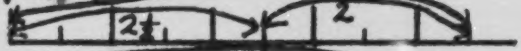
b. $2\frac{2}{3}$



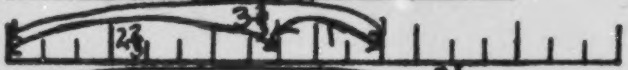
c. $\frac{5}{8}$



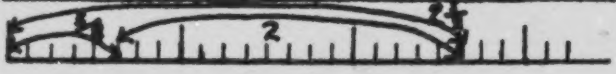
2. a. $2\frac{1}{2}$



b. $2\frac{2}{3}$



c. $\frac{5}{8}$

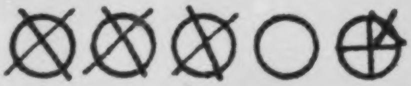


3. a. $2\frac{3}{4}$ d. $\frac{1}{2}$

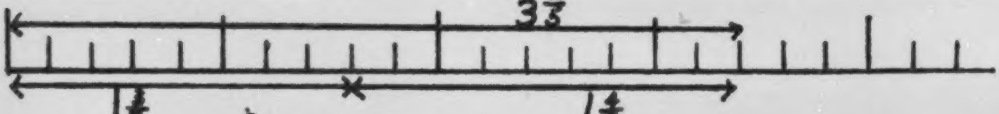
b. $3\frac{7}{8}$ e. $1\frac{2}{3}$

c. $4\frac{4}{5}$ f. $2\frac{7}{9}$

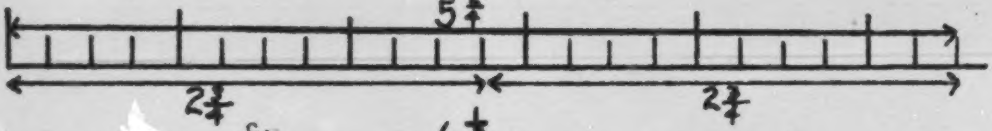
4. $1\frac{3}{4}$



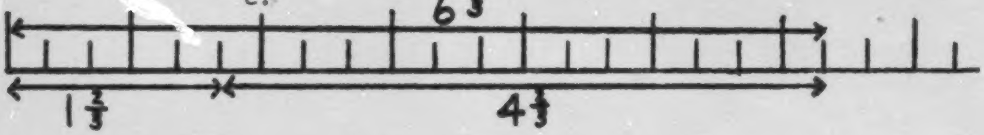
5. a.



b.



c.



6. a. Divide one of the circles into four equal parts.

   b. $2\frac{1}{4}$

7. a. $1\frac{4}{8}$

   b. $2\frac{2}{3}$

   c. $2\frac{2}{6}$

   d. $3\frac{3}{4}$

   e. Divide the unit into n equal parts. n = denominator.

Reference: COLAMBA (1)

Objective X. Given a set of pairs of fractions with unequal denominators, rename each pair by writing them with common denominators.

A. SHORT ACTIVITIES

Page

1. Showing Fractional Parts On A Number Line ---------------- S-21

Material(s): Student activity sheet

Solution(s): A) $\frac{0}{16}$, $\frac{1}{16}$, $\frac{2}{16}$, $\frac{3}{16}$, $\frac{4}{16}$, $\frac{5}{16}$, $\frac{6}{16}$, $\frac{7}{16}$, $\frac{8}{16}$, $\frac{9}{16}$, $\frac{10}{16}$, $\frac{11}{16}$,

$\frac{12}{16}$, $\frac{13}{16}$, $\frac{14}{16}$, $\frac{15}{16}$, $\frac{16}{16}$,

B) $\frac{0}{2}$, $\frac{1}{2}$, $\frac{2}{2}$,

C) $\frac{0}{4}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$,

D) $\frac{0}{8}$, $\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$, $\frac{7}{8}$, $\frac{8}{8}$,

1. $\frac{8}{16}$, $\frac{2}{4}$, $\frac{4}{8}$,
2. $\frac{8}{16}$,
3. $\frac{2}{8}$
4. $\frac{4}{16}$, $\frac{12}{16}$, $\frac{2}{8}$, $\frac{6}{8}$,
5. $\frac{0}{2}$, $\frac{1}{2}$,

Reference: Math Round-Up (5)

2. Finding Other Names For A Fraction ---------------------- S-22

Material(s): Student activity sheet

Solution(s):

1. $\frac{6}{8}$, $\frac{9}{12}$
2. $\frac{6}{16}$, $\frac{9}{24}$, $\frac{12}{32}$
3. $\frac{2}{4}$, $\frac{4}{8}$
4. $\frac{10}{16}$, $\frac{15}{24}$, $\frac{20}{32}$
5. $\frac{3}{2}$, $\frac{6}{4}$
6. $\frac{9}{8}$, $\frac{18}{16}$, $\frac{27}{24}$
7. $\frac{2}{1}$, $\frac{4}{2}$, $\frac{8}{4}$, $\frac{12}{6}$, $\frac{16}{8}$
8. $\frac{7}{4}$, $\frac{14}{8}$, $\frac{21}{12}$, $\frac{28}{16}$

Reference: COLAMBA (1)

Page

3. Sorting Yelof's Liam -- S-23

Material(s): Student activity sheet

Solution(s):

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$
$\frac{13}{26}$	$\frac{2}{6}$, $\frac{3}{9}$, $\frac{6}{18}$	$\frac{25}{100}$	$\frac{3}{15}$, $\frac{4}{20}$	$\frac{4}{24}$	$\frac{3}{21}$, $\frac{7}{49}$, $\frac{5}{35}$
$\frac{2}{3}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{2}{7}$	$\frac{2}{11}$	$\frac{3}{10}$
$\frac{26}{39}$, $\frac{12}{18}$	$\frac{6}{8}$	$\frac{9}{15}$	$\frac{6}{21}$	$\frac{4}{22}$	$\frac{21}{70}$, $\frac{9}{30}$, $\frac{30}{100}$

Reference: West Palm Beach (6)

4. Writing Equivalent Fractions ------------------------------ S-24

Material(s): Student activity sheet

Solution(s):

1. $\frac{(12)}{(12)}$ $\frac{\boxed{12}}{\boxed{24}}$

2. $\frac{\boxed{4}}{\boxed{4}}$

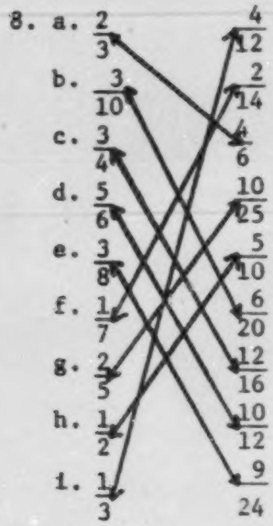
3. $\frac{\boxed{3}}{\boxed{3}}$

4. $\frac{\boxed{5}}{\boxed{5}}$

5. $\frac{\boxed{7}}{\boxed{7}}$

6. $\frac{3}{4}$, $\frac{\boxed{6}}{8}$, $\frac{9}{\boxed{12}}$, $\frac{\boxed{12}}{\boxed{16}}$, $\frac{15}{\boxed{20}}$, $\frac{\boxed{18}}{24}$

7. $\frac{\boxed{3}}{\boxed{10}}$, $\frac{6}{20}$, $\frac{9}{\boxed{30}}$, $\frac{\boxed{12}}{40}$

8\.


B. LAB ACTIVITIES

Page

1. Equivalent Fractions -------------------------------------- L-25

Material(s): Student activity sheets

Solution(s): I.

1. $\frac{0}{4}\quad\frac{1}{4}\quad\frac{2}{4}\quad\frac{3}{4}\;\vdots\;\frac{5}{4}\quad\frac{6}{4}\quad\frac{7}{4}\quad\frac{8}{4}$

2. $\frac{0}{8}\quad\frac{2}{8}\quad\frac{4}{8}\quad\frac{6}{8}\;\vdots\;\frac{10}{8}\quad\frac{12}{8}\quad\frac{14}{8}\quad\frac{16}{8}$

3. $\frac{0}{16}\quad\frac{4}{16}\quad\frac{8}{16}\quad\frac{12}{16}\;\vdots\;\frac{20}{16}\quad\frac{24}{16}\quad\frac{28}{16}\quad\frac{32}{16}$

4. $\frac{0}{32}\quad\frac{8}{32}\quad\frac{16}{32}\quad\frac{24}{32}\;\vdots\;\frac{40}{32}\quad\frac{48}{32}\quad\frac{56}{32}\quad\frac{64}{32}$

5. $\frac{0}{64}\quad\frac{16}{64}\quad\frac{32}{64}\quad\frac{48}{64}\;\vdots\;\frac{80}{64}\quad\frac{96}{64}\quad\frac{112}{64}\quad\frac{128}{64}$

II.

A. $\frac{1}{4} = \frac{2}{8} = \frac{4}{16} = \frac{8}{32} = \frac{16}{64}$

B. $\frac{3}{4} = \frac{6}{8} = \frac{12}{16} = \frac{24}{32} = \frac{48}{64}$

C. $\frac{3}{2} = \frac{6}{4} = \frac{12}{8} = \frac{24}{16} = \frac{48}{32} = \frac{96}{64}$

D. $\frac{7}{4} = \frac{14}{8} = \frac{28}{16} = \frac{56}{32} = \frac{112}{64}$

III.
Answers will vary.

Reference: COLAMBA (1)

2. Nullo -- None

Material(s): Make a deck of NULLO cards as directed.

Method: The deck of cards consists of thirty-five FRACTION cards (five each of the fractions:

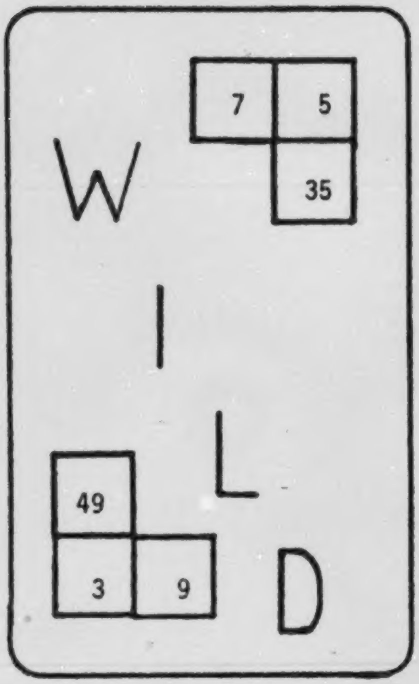
$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}$), and

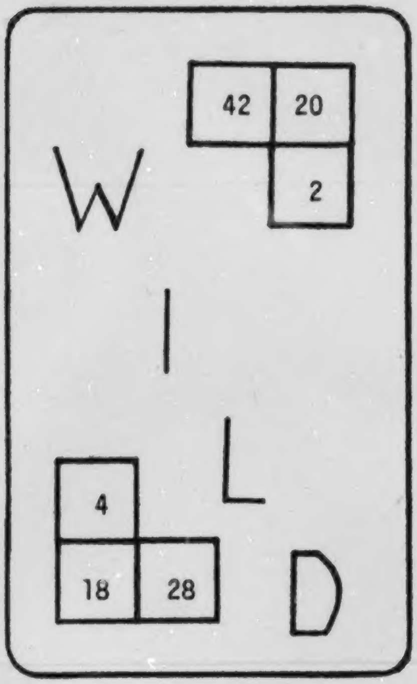
fifty DENOMINATOR cards (2 each of:

$\frac{\_}{2}, \frac{\_}{3}, \frac{\_}{4}, \frac{\_}{5}, \frac{\_}{6}, \frac{\_}{7}, \frac{\_}{8}, \frac{\_}{9}, \frac{\_\_}{10}, \frac{\_\_}{12}, \frac{\_\_}{14}, \frac{\_\_}{15}, \frac{\_\_}{16}, \frac{\_\_}{18},$

$\frac{\_\_}{20}, \frac{\_\_}{21}, \frac{\_\_}{24}, \frac{\_\_}{25}, \frac{\_\_}{28}, \frac{\_\_}{30}, \frac{\_\_}{32}, \frac{\_\_}{40}, \frac{\_\_}{42}, \frac{\_\_}{44}$), and

one each of the WILD cards, as shown on the next page.





It is suggested that the color of the thirty-five FRACTION cards be different from the color of the fifty DENOMINATOR cards.

The symbols (numerals and lettering) could be typed or hand written (you may choose to use templates) on the cards. A nylon tip pen works well for putting the designs on the cards.

Samples of a FRACTION card and a DENOMINATOR card are pictured on the next page.

*The bar above the numeral (on the DENOMINATOR card) denotes the division symbol used in separating the numerator from the denominator of a fraction.

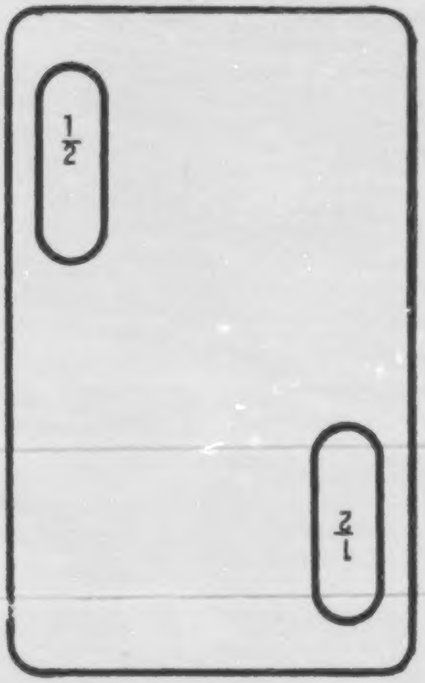
OBJECT OF THE GAME

The first player to accumulate a score of 21 points wins the game.

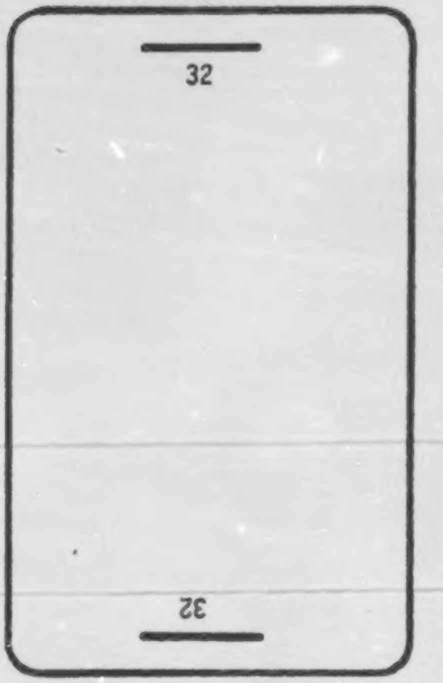
NUMBER OF PLAYERS

Two to four.

FRACTION CARD



DENOMINATOR CARD*

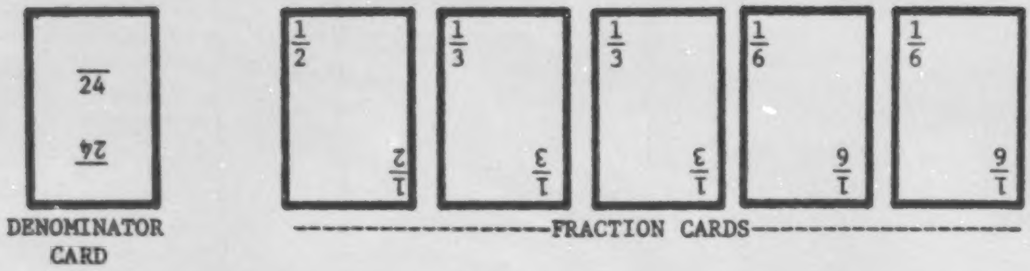


RULES OF THE GAME

1. A dealer is selected by a cut of the DENOMINATOR cards; the player with the smallest DENOMINATOR card deals first.
2. The dealer shuffles the FRACTION cards and DENOMINATOR cards separately.
3. Place the DENOMINATOR cards face down in the center of the table.
4. Deal 7 FRACTION cards, one at a time, to each player. Excess FRACTION cards are placed to the right of the DENOMINATOR cards in the center of the table.
5. To begin play, the player to the dealer's left draws a DENOMINATOR card and uses it or discards it to the left of the DENOMINATOR pile in the center of the table. To use a DENOMINATOR card means that it is played face up with any fraction card(s) whose denominator(s) is(are) a factor(s) of the numeral on the DENOMINATOR card.

Example:

Figure 1



6. If a DENOMINATOR is played and it is not the least common denominator for the set of FRACTION cards played, (see Figure 1), then it may be replaced with a smaller DENOMINATOR card by the original player or any other player during his turn.
   a. When the original player replaces a DENOMINATOR card with another card which is the least common denominator, he has protected his set of cards. (Example: a $\overline{6}$ DENOMINATOR card will protect the set of FRACTION cards in Figure 1, since $\overline{6}$ is the least common denominator.)
   b. When a player replaces an opponent's DENOMINATOR card with a smaller DENOMINATOR card, that player claims the set of FRACTION cards for which he has played a smaller denominator as his own. (Example: In Figure 1 above, a 24 has been played as the DENOMINATOR card with the FRACTION cards shown above. If a player replaced the $\overline{24}$ with a $\overline{12}$, he could claim all five of the FRACTION cards as his own and play them with the $\overline{12}$ card.)
   c. Any player may add to a set of FRACTION cards which has already been played only when he replaces a DENOMINATOR card with a smaller DENOMINATOR card. (Example: The FRACTION cards pictured in Figure 2 may be added to an opponent's cards--Figure 1--if the least common denominator--$\overline{6}$--is used to replace the $\overline{12}$ mentioned in part b above.)

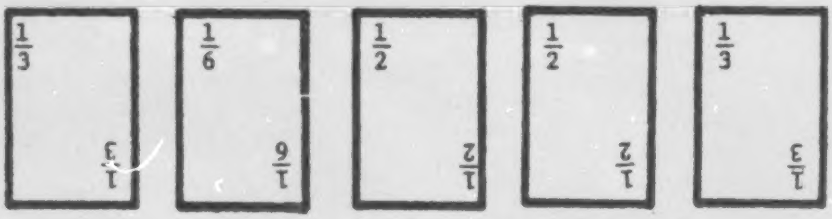


Figure 2

7. The replaced DENOMINATOR card is discarded on top of the discard pile in the center of the table.

8. To continue the play, the players in turn draw a DENOMINATOR card from the DENOMINATOR deck or use the top card in the DENOMINATOR discard pile. (Player must use or discard a DENOMINATOR card. He cannot hold them in his hand.
9. The game continues until a player plays his last FRACTION card and calls "NULLO."
10. A player can take only 1 set of cards at a time by replacing DENOMINATOR cards.
11. When playing and using a "WILD" card, the player must choose only 1 of the denominators on the card and must tell the other players what denominator is being used.

SCORING

A player receives 1 point for each FRACTION card played. (Deduct 1 point for each card remaining in a player's hand at the time "NULLO" is called. Any player can gain or lose points by receiving a "BONUS" or a "PENALTY," respectively.

BONUS

An additional 5 points is given to any player who can play all of his cards as a concealed hand. (A concealed hand is a hand in which a player can play all of his cards at one time.)

PENALTY

If a set of cards is incorrectly played and an opponent calls attention to this error any time during the game, the player who made the error must return the cards played to his hand, discard the DENOMINATOR card to the bottom of the discard pile, and draw a FRACTION card from the excess FRACTION pile placed in the center of the table. If no FRACTION card is left, then 1 point must be deducted from the erring player's accumulated score.

Reference: Gimmicks (2)

Objective XI. Given a set of pairs of fractions with unequal denominators, each pair having either the (+) or the (-) operational sign, perform the operation indicated and rewrite the sum or difference in its simplest form.

A. SHORT ACTIVITIES — Page

1. And More Fences -- S-25

Material(s): Student activity sheet

Solution(s): 1. $\frac{5}{4}$ or $1\frac{1}{4}$ 2. $\frac{8}{8}$ or $\frac{4}{4}$ or 1 3. 2 4. $1\frac{3}{4}$

5. $1\frac{1}{2}$ 6. $\frac{10}{8}$ or $\frac{5}{4}$ or $1\frac{1}{4}$ 7. $1\frac{3}{4}$ 8. $2\frac{1}{8}$

II.

1. $\frac{5}{4}$ or $1\frac{1}{4}$	2. $\frac{3}{4}$	3. $\frac{7}{8}$	4. $\frac{3}{4}$	5. $\frac{3}{8}$
6. 1	7. 1	8. $\frac{5}{8}$	9. 1	10. $\frac{5}{8}$

Reference: COLAMBA (1)

2. Adding Fractional Parts in Chart Form -------------------- S-26

Material(s): Student activity sheets

Solution(s):

+	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$
$\frac{2}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$
$\frac{4}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$
$\frac{6}{8}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$
$\frac{7}{8}$	1	$\frac{9}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$
$\frac{8}{8}$	$\frac{9}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2

$\frac{1}{2}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$	$1\frac{1}{6}$	$1\frac{3}{6}$	$1\frac{5}{16}$	$1\frac{7}{16}$
$\frac{1}{4}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$	$1\frac{1}{16}$	$1\frac{3}{16}$
$\frac{1}{8}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$	$1\frac{1}{16}$
$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
+	$\frac{1}{16}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$

Reference: Math Round Up (5)

Page

3. Circle Chart and Quizzes ---------------------------------- S-27

Material(s): Student activity sheets

Method: Give each student a circle chart and stress that it is an aid for him and will be used regularly, so he must save it to refer to. Discuss the chart in class and encourage them to mark them with any helpful information. After they have become familiar with the chart, then give quizzes which use it. It is recommended that the quizzes be given regularly, for example, every Thursday (roughly fifteen minutes).

Solution(s):

	1	2
1.	$\frac{17}{20}$ or 1.35	$1\frac{1}{2}$
2.	$\frac{13}{40}$ or $1.07\frac{1}{2}$	$2\frac{27}{40}$
3.	$2\frac{1}{5}$ or 2.20	$2\frac{11}{60}$
4.	$1\frac{11}{15}$ or $1.73\frac{1}{3}$	F
5.	T	T
6.	F	T
7.	F	F
8.	F	$1\frac{3}{5}$
9.	T	F
10.	F	F

	3	4
1.	$1\frac{7}{20}$	$1\frac{1}{2}$
2.	F	F
3.	$1\frac{3}{40}$	$2\frac{27}{40}$
4.	T	T
5.	$2\frac{1}{5}$	$2\frac{11}{60}$
6.	T	T
7.	F	T
8.	T	T
9.	$2\frac{17}{20}$	$2\frac{23}{40}$
10.	$3\frac{3}{4}$	$4\frac{7}{8}$

	5	6	7	8
1.	F	.27	1.33	9
2.	$\frac{9}{10}$	.47	T	1
3.	T	4.18	2.45	3 or 11
4.	$3\frac{3}{10}$	.68	F	1
5.	T	T	T	4.18
6.	$3\frac{11}{20}$	F	F	5.35
7.	F	T	T	T
8.	F	F	2.85	T
9.	$2\frac{17}{40}$	T	3.08	T
10.	$3\frac{14}{15}$	T	F	T

Reference: LAMP (3)

Page

4. If $\boxed{\cdot}$ Is One Then ---------------------------------- S-28

Material(s): Student activity sheet

Solution(s): 1. $1\frac{3}{4}$ 2. $1\frac{2}{4}$ 3. $1\frac{4}{8}$ 4. 3 5. $4\frac{3}{6}$

5. Tanagram Addition -- S-29

Material(s): Student activity sheets

6. Let's Make A Square -- S-30

Material(s): Student activity sheet

Method: The sum of the rows and columns will be the same. The diagonals will not.

Solution(s):

$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{5}$
$\frac{1}{6}$	$\frac{11}{30}$	$\frac{1}{2}$
$\frac{16}{30}$	$\frac{1}{6}$	$\frac{1}{3}$

B. LAB ACTIVITIES

1. Fractional War -- None

Material(s): Use cards from "Over Orange" game.

Method: Using the cards from "Over Orange," divide them evenly between two players and each stack is placed face down on the table. The players simultaneously turn over one card at a time and each player takes a turn adding or subtracting the two fractions. This is continued until all the cards have been used.

The player getting the most correct responses is the winner.

Since this game can be played by only two people at one time, this could help those who are having difficulty adding and subtracting fractions.

2. Cover Up -- L-26

Material(s): Student activity sheets, scissors

Solution(s):

1. 4
2. 10
3. 2
4. 6
5. $\frac{5}{6}$, $\frac{10}{12}$
6. $\frac{6}{8}$, $\frac{3}{4}$
7. $\frac{11}{12}$
8. $\frac{10}{12}$, $\frac{5}{6}$
9. $\frac{11}{12}$
10. $\frac{3}{4}$, $\frac{6}{8}$, $\frac{9}{12}$
11. $\frac{3}{6}$, $\frac{1}{2}$, $\frac{6}{12}$, $\frac{4}{8}$, $\frac{2}{4}$
12. $\frac{5}{6}$, $\frac{10}{12}$
13. $\frac{7}{12}$
14. $\frac{6}{6}$, 1, $\frac{3}{3}$, $\frac{4}{4}$, $\frac{6}{6}$, $\frac{8}{8}$, $\frac{12}{12}$
15. Not possible
16. $\frac{11}{12}$
17. $\frac{9}{12}$, $\frac{3}{4}$
18. $\frac{4}{4}$, 1, $\frac{8}{8}$, $\frac{6}{6}$, $\frac{3}{3}$, $\frac{12}{12}$, $\frac{3}{3}$
19. $\frac{1}{6}$
20. $\frac{5}{12}$
21. Impossible
22. $\frac{2}{6}$, $\frac{1}{3}$
23. $\frac{1}{3}$, $\frac{2}{6}$
24. $\frac{3}{6}$, $\frac{1}{2}$, $\frac{4}{8}$, $\frac{6}{12}$, $\frac{2}{4}$
25. $\frac{1}{12}$

5. $\frac{1}{2}$
6. equal
7. $\frac{2}{3}$
8. $\frac{2}{4}$
9. $\frac{2}{3}$
10. $\frac{1}{2}$
11. $\frac{1}{3}$
12. $\frac{2}{3}$
13. $\frac{1}{2}$
14. $\frac{4}{6}$
15. $\frac{1}{3}$
16. $\frac{3}{4}$
17. $\frac{2}{3}$
18. $\frac{3}{4}$
19. $\frac{2}{3}$
20. $\frac{3}{4}$
21. $\frac{2}{3}$
22. $\frac{5}{6}$
23. $\frac{2}{3}$
24. $\frac{5}{6}$
25. $\frac{3}{4}$

Reference: COLAMBA (1)

Page

3. Fractions Aren't What They Used to be -------------------- L-27

Material(s): Student activity sheet, ruler

Solution(s):

1. $\frac{5}{8} = \frac{1}{2} + \frac{1}{8}$
2. $\frac{3}{8} = \frac{1}{4} + \frac{1}{8}$
3. $\frac{9}{16} = \frac{1}{2} + \frac{1}{16}$
4. $\frac{3}{4} = \frac{1}{2} + \frac{1}{4}$
5. $\frac{7}{8} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$
6. $\frac{3}{16} = \frac{1}{8} + \frac{1}{16}$
7. $\frac{7}{16} = \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$
8. $\frac{9}{16} = \frac{1}{2} + \frac{1}{16}$
9. $\frac{11}{16} = \frac{1}{2} + \frac{1}{8} + \frac{1}{16}$
10. $\frac{13}{16} = \frac{1}{2} + \frac{1}{4} + \frac{1}{16}$
11. $\frac{3}{32} = \frac{1}{16} + \frac{1}{32}$
12. $\frac{5}{32} = \frac{1}{8} + \frac{1}{32}$
13. $\frac{7}{32} = \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$
14. $\frac{13}{32} = \frac{1}{4} + \frac{1}{8} + \frac{1}{32}$
15. $\frac{15}{16} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$
16. $\frac{15}{32} = \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$
17. $\frac{21}{32} = \frac{1}{2} + \frac{1}{8} + \frac{1}{32}$
18. $\frac{27}{32} = \frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{32}$

Reference: COLAMBA (1)

4. Domino Puzzle -- None

Material(s): Set of Dominoes without doubles and blanks.

Method: Using numerals for the spots, regard the remaining dominoes as fractions. Using only proper fractions, arrange them into three rows of five each with a sum of $2\frac{1}{2}$.

Solution(s):

$\boxed{\frac{3}{4}} + \boxed{\frac{1}{4}} + \boxed{\frac{3}{6}} + \boxed{\frac{1}{2}} + \boxed{\frac{2}{4}} = 2\frac{1}{2}$

$\boxed{\frac{5}{6}} + \boxed{\frac{2}{6}} + \boxed{\frac{1}{3}} + \boxed{\frac{4}{5}} + \boxed{\frac{1}{5}} = 2\frac{1}{2}$

$\boxed{\frac{4}{6}} + \boxed{\frac{1}{6}} + \boxed{\frac{2}{3}} + \boxed{\frac{3}{5}} + \boxed{\frac{2}{5}} = 2\frac{1}{2}$

Now, try to make the sum in every row of five equal ten. You may use improper fractions to do this.

$\boxed{\frac{1}{3}} + \boxed{\frac{6}{1}} + \boxed{\frac{3}{4}} + \boxed{\frac{5}{3}} + \boxed{\frac{5}{4}} = 10$

$$\boxed{\frac{2}{1}} + \boxed{\frac{5}{1}} + \boxed{\frac{2}{6}} + \boxed{\frac{6}{3}} + \boxed{\frac{4}{6}} = 10$$

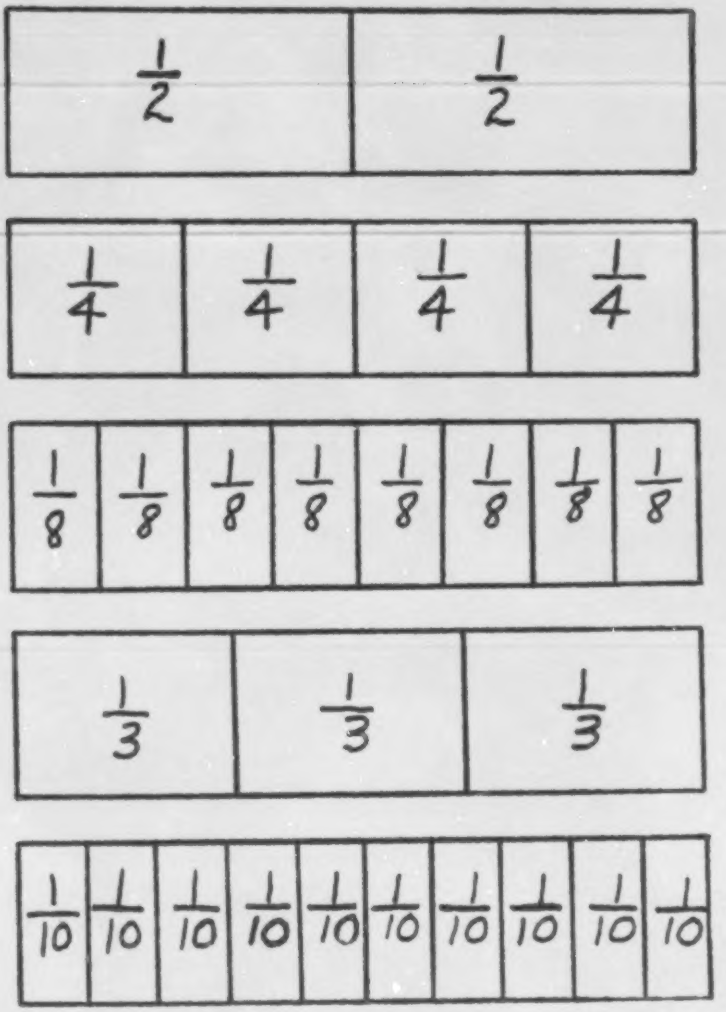
$$\boxed{\frac{4}{1}} + \boxed{\frac{2}{3}} + \boxed{\frac{4}{2}} + \boxed{\frac{5}{2}} + \boxed{\frac{5}{6}} = 10$$

	Page
5. Raceway	L-28

Material(s): Playboard, spinner, markers, score sheets.

6. Frac	None

Material(s): Cut units of different colored oak tag or paper into halves, thirds, fourths, eighths, and tenths, as shown below, and put all 32 pieces in a box.


1/2 1/2
1/4 1/4 1/4 1/4
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
1/3 1/3 1/3
1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10

Method: Two or four players draw in turn from the box until a hand of 16 or 8 pieces is complete. The first player must place a half on the table if he has it or, otherwise, say "FRAC" and pass.

The object is to get rid of as many pieces as possible by building units, first by halves, then by thirds, by fourths, etc. As each player places a fractional piece on the table, he must tell, in lowest terms, how much of the unit is so far shown. For example, if he places the second ¼ piece on the table, he must say, "Two fourths equal one half." A turn is lost if an incorrect answer is given. The winner is the one whose hand is depleted first.

Page

7. Using the Ruler --- L-29

Material(s): Student activity sheet, ruler

Solution(s):

1. $3\frac{1}{2}$
2. $1\frac{1}{2}$
3. 2
4. 1
5. 4
6. $3\frac{3}{4}$
7. $5\frac{3}{4}$
8. $1\frac{3}{4}$
9. $2\frac{3}{4}$
10. $1\frac{1}{2}$
11. 3
12. $4\frac{3}{4}$
13. $1\frac{1}{4}$
14. $2\frac{1}{4}$
15. $3\frac{1}{2}$
16. $4\frac{1}{4}$
17. 5
18. $3\frac{1}{4}$
19. 1
20. $6\frac{1}{4}$
21. 5
22. 5
23. $2\frac{1}{4}$
24. $6\frac{1}{4}$
25. $6\frac{3}{4}$
26. $2\frac{3}{4}$
27. $6\frac{1}{4}$
28. $4\frac{1}{4}$

8. Predictions --- L-30

Material(s): Student activity sheet

Method: Instruct the learner to write what is his pattern (in number one he must add ¼ each time) and complete the pattern.

Solution(s):

Pattern	Prediction
1. Add $\frac{1}{4}$	$1,\ 1\frac{1}{4},\ 1\frac{1}{2},\ 1\frac{3}{4},\ 2$
2. Add $\frac{1}{3}$	$2\frac{2}{3},\ 3,\ 3\frac{1}{3},\ 3\frac{2}{3},\ 4,\ 4\frac{1}{3}$
3. Add $\frac{2}{5}$	$1\frac{3}{5},\ 2,\ 2\frac{2}{5},\ 2\frac{4}{5},\ 3\frac{1}{5}$
4. Subtract $\frac{2}{8}$	$4\frac{3}{8},\ 4\frac{1}{8},\ 3\frac{7}{8},\ 3\frac{5}{8},\ 3\frac{3}{8},\ 3\frac{1}{8}$
5. Given	$\frac{9}{6},\ \frac{11}{6},\ \frac{13}{6},\ \frac{15}{6},\ \frac{17}{6},\ \frac{19}{6},\ \frac{21}{6}$

6. Add $\frac{3}{4}$ — $3, 3\frac{3}{4}, 4\frac{1}{2}, 5\frac{1}{4}, 6$

7. Given — $1\frac{1}{2}, 1\frac{1}{6}, \frac{5}{6}, \frac{1}{2}, \frac{1}{6}$

8. Add $1\frac{1}{4}$ — $11\frac{1}{4}, 12\frac{1}{2}, 13\frac{3}{4}, 15$

9. Add $\frac{1}{16}$ — $\frac{11}{16}, \frac{3}{4}, \frac{13}{16}, \frac{7}{8}, \frac{15}{16}$

10. Add $\frac{1}{5}$ — $2, 2\frac{1}{5}, 2\frac{3}{5}, 2\frac{4}{5}$

11. Add $\frac{1}{8}$ or $\frac{2}{16}$ — $\frac{15}{16}, 1\frac{1}{16}, 1\frac{3}{16}, 1\frac{5}{16}$

12. Subtract $\frac{1}{4}$ — $8\frac{3}{4}, 8\frac{1}{2}, 8, 7\frac{3}{4}, 7\frac{1}{2}$

13. Add $\frac{1}{12}$ — $2\frac{1}{3}, 2\frac{5}{12}, 2\frac{1}{2}, 2\frac{7}{12}$

14. Add $\frac{1}{2}$ — $\frac{5}{2}, 3, \frac{7}{2}, 4$

Reference: COLAMBA (1)

	Page
9. Fold 'er Up --	L-31

Material(s): Student activity sheet, scissors

Solution(s):

1.	2.	3.	4.
a. 8	a. 8	a. 8	a. $\frac{6}{8}, \frac{3}{4}$
b. 4	b. 2	b. 4	b. $\frac{2}{8}, \frac{1}{4}$
c. 2	c. 4	c. 2	c. $\frac{7}{8}$
d. 6	d. 6	d. 6	d. $\frac{3}{8}$
			e. $\frac{7}{8}$ g. $\frac{3}{8}$
			f. $\frac{1}{8}$ h. $\frac{5}{8}$

Objective XII. Write the reciprocal of any non-zero fraction.

A. SHORT ACTIVITIES

B. LAB ACTIVITIES

Objective XIII. Given a set of pairs of fractions, each pair having either the (x) or the (÷) operation sign, write the product or quotient in its simplest form.

A. SHORT ACTIVITIES

1. Tanagram Multiplication ------------------------------------ S-31

Material(s): Student activity sheets

2. Fraction-Gram -- S-32

Material(s): Student activity sheet

Method: The fraction-grams are set up with a key or set of numbers in the upper left-hand corner. These numbers are equated with symbols and are to be substituted for the symbols to make the problems. There are many possible combinations of symbols. Only one, or at most two sets of problems should be given at one time. Best results will be obtained by using just two on any given day, since this type of student is highly resentful of busy-work. Each page could be used many different times.

Each time the exercise is used the teacher should stipulate which sets of problems (1-9) are to be used. For example, to use 8 and 9, have the student circle the numbers, and then write the symbols and operations on the exercise line. He will then proceed to write the problems and solve them.

Run off enough copies so that each student will be able to receive 5 or 6 sheets over a period of time (a semester).

Solution(s):

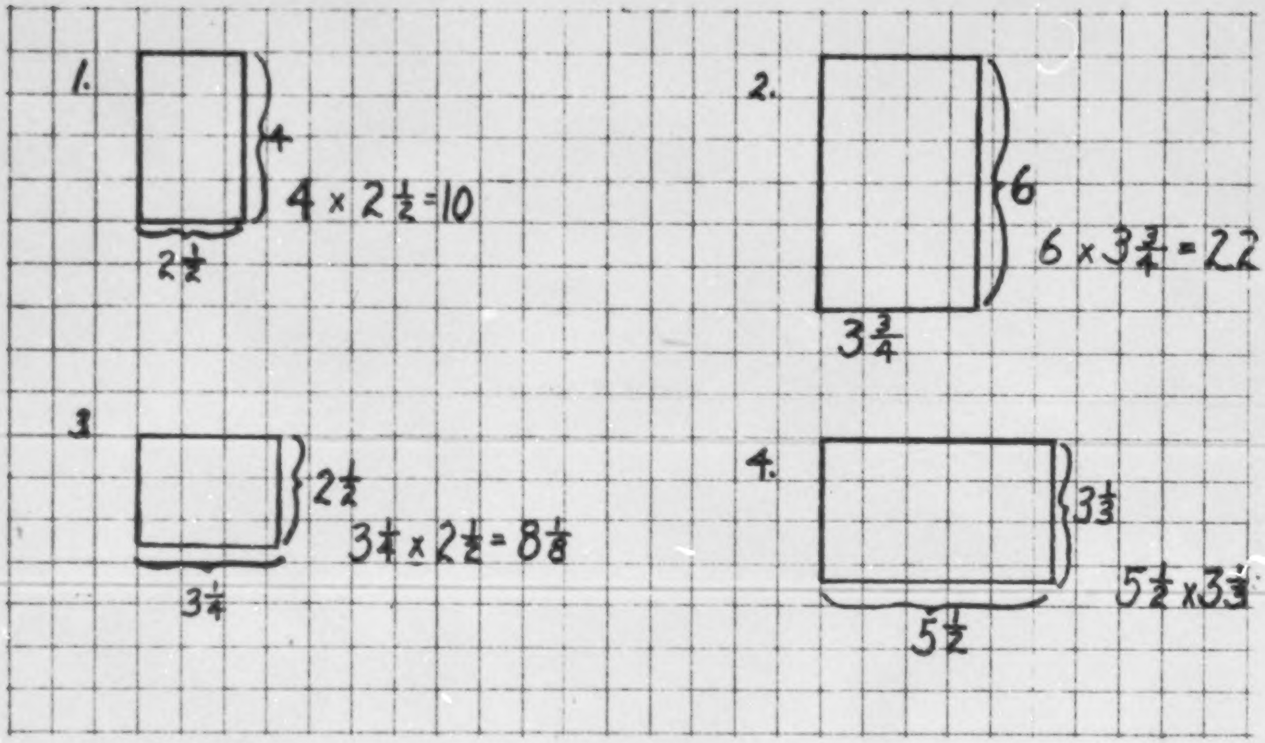
	I	II		I	II		I	II
1. A.	$\frac{3}{4}$	$\frac{5}{12}$	4. A.	$\frac{1}{8}$	$\frac{1}{12}$	7. A.	3	$1\frac{1}{2}$
B.	$1\frac{4}{15}$	$1\frac{2}{45}$	B.	$\frac{11}{35}$	$\frac{7}{45}$	B.	$1\frac{1}{2}$	$1\frac{7}{20}$
C.	$1\frac{17}{24}$	$1\frac{5}{24}$	C.	$\frac{3}{4}$	$\frac{11}{24}$	C.	$2\frac{1}{3}$	$2\frac{2}{9}$
D.	$1\frac{13}{40}$	$1\frac{12}{35}$	D.	$\frac{31}{80}$	$\frac{2}{35}$	D.	$\frac{35}{36}$	$1\frac{4}{15}$
2. A.	$\frac{7}{24}$	$\frac{5}{8}$	5. A.	$\frac{1}{16}$	$\frac{1}{8}$	8. A.	2	$\frac{1}{2}$
B.	$\frac{46}{63}$	$\frac{20}{21}$	B.	$\frac{4}{21}$	$\frac{2}{5}$	B.	$2\frac{1}{10}$	$\frac{10}{21}$
C.	$\frac{11}{24}$	$\frac{23}{24}$	C.	$\frac{7}{96}$	$\frac{35}{48}$	C.	10	$\frac{1}{10}$
D.	$\frac{107}{112}$	$\frac{15}{16}$	D.	$\frac{25}{128}$	$\frac{7}{16}$	D.	$2\frac{6}{25}$	$\frac{25}{56}$
3. A.	$\frac{1}{3}$	$\frac{1}{4}$	6. A.	$\frac{1}{24}$	$\frac{1}{48}$	9. A.	1	$\frac{2}{3}$
B.	$\frac{2}{9}$	$\frac{1}{15}$	B.	$\frac{4}{15}$	$\frac{8}{63}$	B.	$1\frac{2}{5}$	$\frac{20}{27}$
C.	$\frac{1}{2}$	$\frac{1}{24}$	C.	$\frac{5}{16}$	$\frac{1}{32}$	C.	$8\frac{3}{4}$	$\frac{9}{20}$
D.	$\frac{1}{56}$	$\frac{3}{40}$	D.	$\frac{9}{20}$	$\frac{4}{225}$	D.	$1\frac{2}{5}$	$\frac{45}{49}$

Reference: LAMP (3)

	Page
3. Multiplying Mixed Numbers ------------------------------	S-33

Material(s): Student activity sheet

Solution(s):


1.
4
2½
4 × 2½ = 10
2.
6
3¾
6 × 3¾ = 22
3
2½
3¼
3¼ × 2½ = 8⅛
4.
3⅓
5½
5½ x 3⅓

4. Into Outer Space With "Of" -------------------------------- S-34

Material(s): Student activity sheet

Solution(s): 1. $\frac{2}{5}$ or $\frac{4}{10}$

2. A. = $\frac{1}{4}$

B. = $\frac{1}{8}$

3. $\frac{1}{6}$

4. $\frac{1}{8}$

5. $\frac{1}{6}$

Reference: West Palm Beach (6)

5. Showing Multiplication with Circles ---------------------- S-35

Material(s): Student activity sheets, scissors, extra paper

Method: Assign problems for student to find the solution by using circles.

Solution(s): II. 1. $\frac{3}{8}$ 2. $\frac{1}{15}$ 3. $\frac{25}{48}$

Page

6. Product "One" -- S-36

Material(s): Student activity sheet

Solution(s):
1. $\frac{1}{4}$
2. $\frac{1}{6}$
3. $\frac{1}{9}$
4. $\frac{1}{12}$
5. $\frac{1}{8}$
6. $\frac{1}{10}$
7. 2
8. 3
9. 4
10. 5
11. 6
12. 6
13. $\frac{9}{2}$ or $4\frac{1}{2}$
14. $\frac{12}{5}$ or $2\frac{2}{5}$
15. Answers will vary.

7. Number Line Division ------------------------------------- S-37

Material(s): Student activity sheet

Solution(s):
1. 6
2. 12
3. 2
4. 2, 2
5. 7, 7
6. 6, 6

8. Complete the Tables --------------------------------------- S-38

Material(s): Student activity sheet

Solution(s):

x	$\frac{3}{4}$	$\frac{3}{7}$	$\frac{7}{8}$	$\frac{3}{5}$	$\frac{1}{3}$	$\frac{3}{10}$
$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{14}$	$\frac{7}{16}$	$\frac{3}{10}$	$\frac{1}{6}$	$\frac{3}{20}$
$\frac{2}{5}$	$\frac{3}{10}$	$\frac{6}{35}$	$\frac{7}{10}$	$\frac{6}{25}$	$\frac{2}{15}$	$\frac{6}{50}$
$\frac{1}{4}$	$\frac{3}{16}$	$\frac{3}{28}$	$\frac{7}{32}$	$\frac{3}{20}$	$\frac{1}{12}$	$\frac{3}{40}$
$\frac{2}{7}$	$\frac{3}{14}$	$\frac{6}{49}$	$\frac{1}{4}$	$\frac{6}{35}$	$\frac{2}{21}$	$\frac{3}{35}$
$\frac{5}{8}$	$\frac{15}{32}$	$\frac{15}{56}$	$\frac{35}{64}$	$\frac{3}{8}$	$\frac{5}{24}$	$\frac{3}{16}$
$\frac{5}{16}$	$\frac{15}{64}$	$\frac{15}{112}$	$\frac{35}{128}$	$\frac{3}{16}$	$\frac{5}{48}$	$\frac{3}{32}$

x	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{5}$	$\frac{2}{11}$	$\frac{2}{3}$
$\frac{1}{8}$	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{20}$	$\frac{1}{44}$	$\frac{1}{12}$
$\frac{2}{5}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{4}{25}$	$\frac{4}{55}$	$\frac{4}{15}$
$\frac{1}{9}$	$\frac{1}{18}$	$\frac{1}{12}$	$\frac{2}{45}$	$\frac{2}{99}$	$\frac{2}{27}$
$\frac{3}{16}$	$\frac{3}{32}$	$\frac{9}{64}$	$\frac{3}{40}$	$\frac{3}{88}$	$\frac{1}{8}$
$\frac{1}{12}$	$\frac{1}{24}$	$\frac{1}{16}$	$\frac{1}{30}$	$\frac{1}{66}$	$\frac{1}{18}$

Reference: COLAMBA (1)

Page

9. Make Them Well Again -- S-39

Material(s): Student activity sheet

Solution(s): Answers will vary in part I.

Part II:
1. 2 2. 4 3. 8 4. 16

Part III:
1. 7 2. 8 3. 2 oz. 4. $\frac{12}{8} = \frac{3}{2} = 1\frac{1}{2}$ in.

5. 12 6. 3

7. 660 ft. or 220 yd.

8. 1 pt. 9. 250 lb. 10. 3

10. Money Fractions -- S-40

Material(s): Student activity sheet

Solution(s)
1. 50 or 50 or $.50
2. 150 or 150 or $1.50
3. 25 or 25 or $.25
4. 75 or 75 or $.75
5. 120 or 120 or $1.20
6. 150 or 150 or $1.50
7. 225 or 225 or $2.25
8. 10 or 10 or $.10
9. 90 or 90 or $.90
10. 150 or 150 or$1.50
11. 230 or 230 or $2.30

Reference: Math Round Up (5)

11. Fill In The Missing Numerators ---------------------------- S-41

Material(s): Student activity sheet

Solution(s):
a) 1, 3
b) 1, 2, 3, 4
c) 1, 2, 3, 4, 5, 6, 7, 8, 9
d) 3, 10, 13, 19
e) 50

Reference: Math Round Up (5)

B. LAB ACTIVITIES

1. Measure Up -- L-32

Material(s): Student activity sheets, rulers and yardsticks

Solution(s): I: 1. $\frac{1}{3}$ 2. $\frac{1}{3}$ 3. $\frac{3}{4}$

4. $\frac{5}{6}$ 5. $\frac{6}{4}$ 6. $\frac{1}{2}$

II: B = $1\frac{3}{4}$ ft. 21 in. $\frac{7}{12}$ yd.

C = $\frac{1}{2}$ ft. 6 in. $\frac{1}{6}$ yd.

D = [illegible]$\frac{1}{4}$ ft. 27 in. $\frac{3}{4}$ yd.

E = $3\frac{1}{2}$ ft. 42 in. $\frac{7}{6}$ or $1\frac{1}{6}$ yd.

III: 1. 12 in. 2. 6 in. 3. $\frac{1}{3}$ ft.

4. 4 in. 5. $\frac{2}{3}$ ft. 6. 9 in. 7. 1 in.

IV: B = $\frac{6}{12}$ or $\frac{1}{2}$

C = $\frac{4}{12}$ or $\frac{1}{3}$

D = $\frac{1}{12}$

E = $\frac{10}{12}$ or $\frac{5}{6}$

F = $\frac{12}{12}$ or 1

V: 1. 8 oz. 2. 4 oz. 3. 2 oz.

4. $\frac{1}{2}$ lb. 5. $\frac{3}{16}$ lb. 6. $\frac{1}{8}$ lb.

7. $\frac{3}{4}$ lb. 8. 32 oz. 9. 24 oz.

10. $1\frac{1}{4}$ lbs. 11. 1000 lbs. 12. $\frac{1}{4}$ ton

Reference: COLAMBA (1)

Page

2. D = 1 -- L-33

Material(s): Student activity sheet

Solution(s): A: 2. $\frac{4 \times 8}{5 \times 9} = \frac{32}{45}$ 3. $\frac{2 \times 5}{3 \times 6} = \frac{10}{18}$

4. $\frac{9 \times 11}{10 \times 12} = \frac{99}{120}$ 5. $\frac{6 \times 5}{1 \times 1} = \frac{30}{1}$

6. $\frac{4 \times 3}{1 \times 4} = \frac{12}{4}$

B: 1. $\frac{4}{2}$

2. $\frac{1}{20}$

3. $\frac{3}{3}$

4. $\frac{6}{20}$

5. $\frac{1}{48}$

6. $\frac{21}{45}$

7. $\frac{3}{40}$

8. $\frac{35}{6}$

9. $\frac{3}{8}$

10. $\frac{30}{9}$

11. $\frac{32}{7}$

12. $\frac{45}{6}$

13. $\frac{6}{15}$

14. $\frac{8}{63}$

15. $\frac{30}{56}$

16. $\frac{8}{25}$

17. $\frac{24}{4}$

18. $\frac{40}{54}$

19. $\frac{9}{32}$

20. $\frac{54}{7}$

21. $\frac{24}{9}$

22. $\frac{35}{8}$

Reference: West Palm Beach (6)

Page

3. Yardstick Multiplication ---------------------------------- L-34

Material(s): Student activity sheet, yardstick

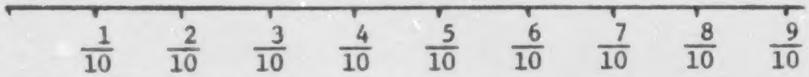
Solution(s):
1. 12
2. 24
3. 36
4. 18
5. 9
6. 27
7. 6
8. 12
9. 30
10. 60
11. 16
12. 45
13. 42

Reference: COLAMBA (1)

4. Tenths A Plenty -- L-35

Material(s): Student activity sheet, ruler

Solution(s): 1. 5 inch line $\frac{1}{10}$ every $\frac{1}{2}$ inch.

2. 

3. $\frac{1}{2}$ or many possibilities

4. $\frac{9}{10}$, $\frac{6}{10}$, $\frac{7}{10}$, $\frac{8}{10}$

5. 10

6. a. 10
b. 200 lbs.
c. 10 cents
d. 528 ft.
e. 6 min.
f. ½ ft.
g. 70 cents
h. 176 yds.
i. 54 min.
j. 1400 lbs.
k. 30 cents
l. 3,696 ft.

5. Frenzied Diagrams -- L-36

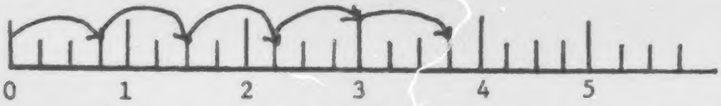
Material(s): Student activity sheet

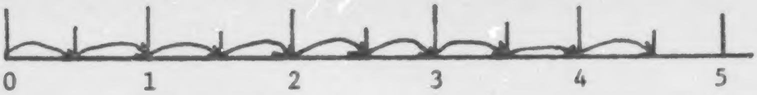
Solution(s): 1. 4

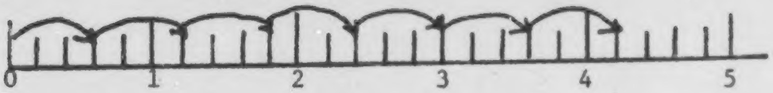
2. a. $\frac{2}{3}$ b. 6 c. $\frac{2}{3} \times 6$

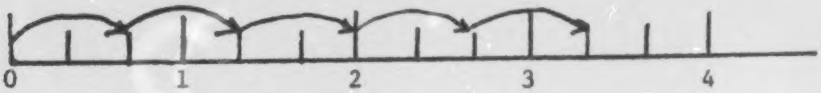
3. yes

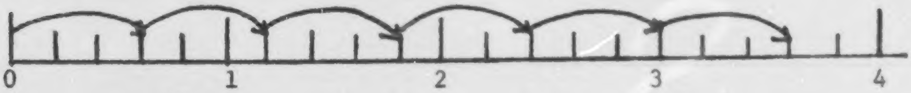
4. self teaching

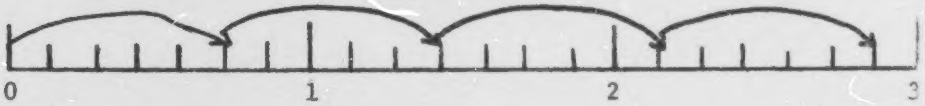
5. 

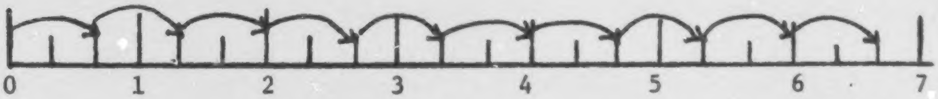
6. 

7. 

8. 

9. 

10. 

11. 

12. 7, 8, 3

13. $\frac{5}{1}$

14. $\frac{5 \times 3}{1 \times 4}$

15. Improper

16. $3\frac{3}{4}$

17. $5 \times \frac{4}{5}$ or $\frac{4}{5} \times 5$

18. $3 \times 1\frac{1}{6}$ or $3 \times \frac{7}{6}$ or $1\frac{1}{6} \times 3$ or $\frac{7}{6} \times 3$

19. $13 \times \frac{1}{2}$ or $\frac{1}{2} \times 13$

20. $\frac{a \times c}{b \times d} = \frac{ac}{bd}$

Reference: COLAMBA (1)

Page

6. More Frenzied Diagrams ------------------------------------ L-37

Material(s): Student activity sheet

Solution(s): 1. a.

b.

c. $\frac{1}{2}$ of $\frac{1}{3}$ and $\frac{1}{6}$

2. c. $\frac{1}{2}$ of $\frac{1}{4}$ and $\frac{1}{8}$

3. c. $\frac{1}{3}$ of $\frac{2}{3}$ and $\frac{2}{9}$

4. c. $\frac{1}{5}$ of $\frac{2}{3}$ and $\frac{2}{5}$

d. yes

5. $\frac{1}{6}$ 6. $\frac{1}{8}$ 7. $\frac{1}{12}$ 8. $\frac{1}{15}$

9. $\frac{1}{10}$ 10. $\frac{1}{12}$ 11. yes 12. $\frac{1}{32}$

13. $\frac{1}{36}$ 14. $\frac{5}{24}$ 15. $\frac{2}{15}$ 16. $\frac{8}{21}$

17. yes 18. — 19. $\frac{3}{14}$ 20. $\frac{3}{20}$

21. $\frac{9}{20}$ 22. $\frac{5}{18}$ 23. $\frac{1}{2} \times \frac{3}{4}$ 24. $\frac{3}{4} \times \frac{3}{4}$

25. $\frac{1}{3} \times \frac{5}{8}$ 26. $\frac{3}{4} \times \frac{1}{2}$ 27. $\frac{1}{3} \times \frac{1}{2}$ 28. $\frac{3}{4} \times \frac{3}{5}$

29. $\frac{4}{5} \times \frac{3}{4}$ 30. $\frac{2}{3} \times \frac{4}{5}$

Reference: COLAMBA (1)

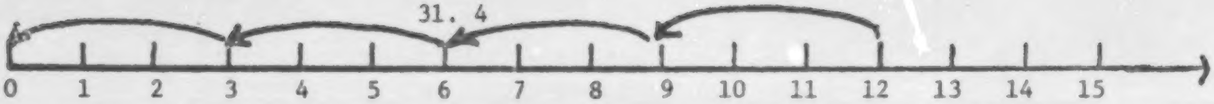
7. Jumping Division -- Page L-38

Material(s): Student activity sheet

Solution(s):

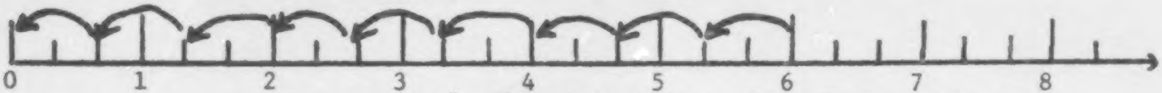
1. $\frac{1}{6}$
2. $\frac{1}{8}$
3. $\frac{1}{10}$
4. 1
5. 3
6. 2
7. 1
8. 1
9. 11
10. 1
11. $\frac{5}{2}$
12. $\frac{13}{4}$
13. $\frac{21}{11}$
14. $\frac{8}{5}$
15. $\frac{17}{2}$
16. $\frac{53}{21}$
17. $\frac{373}{101}$
18. $\frac{37}{43}$
19. $\frac{243}{256}$
20. $\frac{81}{512}$
21. $\frac{2}{5}$
22. $\frac{3}{11}$
23. $\frac{4}{21}$
24. $\frac{3}{7}$
25. —
26. $\frac{5}{3}$
27. $\frac{1}{9}$
28. $\frac{2}{3}$
29. $\frac{8}{15}$
30. zero

31. 4



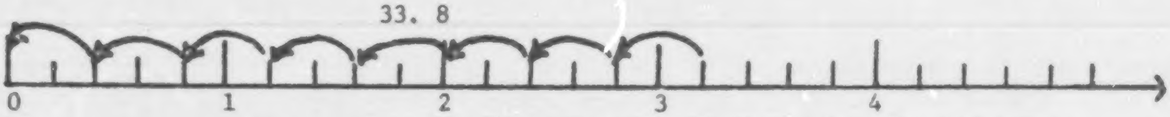
4. They are reciprocals. The answers are the same.

32. 9



9. They are reciprocals. They are the same.

33. 8



8. They are reciprocals. They are the same.

34. Multiply the dividend by the reciprocal of the divisor.

35. $\frac{5}{6} \times \frac{5}{3}$ 36. $1\frac{2}{3} \times \frac{5}{4}$

37. a. $\frac{1}{6}$ b. 3 c. $\frac{5}{2}$ d. $\frac{7}{3}$ e. $\frac{19}{11}$

f. $\frac{5}{21}$ g. $\frac{3}{11}$ h. $\frac{2}{9}$ i. $\frac{5}{31}$

38. a. $\frac{3}{4} \times \frac{7}{5}$ b. $\frac{1}{2} \times \frac{3}{2}$ c. $3\frac{2}{5} \times \frac{5}{4}$

d. $\frac{5}{6} \times \frac{2}{3}$ e. $\frac{9}{11} \times \frac{4}{11}$ f. $\frac{3}{8} \times \frac{8}{9}$

39. a. $\frac{5}{2} = 2\frac{1}{2}$ b. $\frac{35}{6} = 5\frac{5}{6}$ c. $\frac{40}{33} = 1\frac{7}{33}$

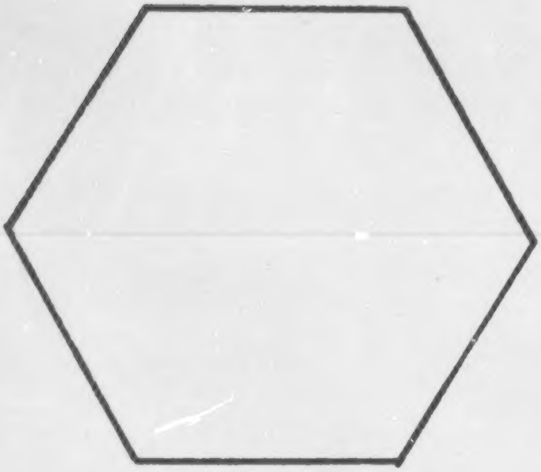
d. $\frac{3}{7}$ e. 1

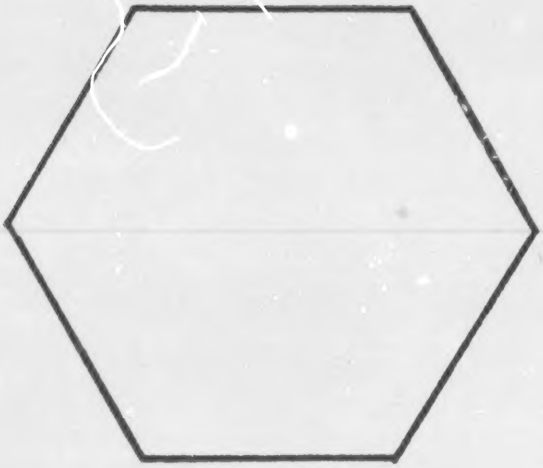
Page
8. How Many Are in One? -- L-39

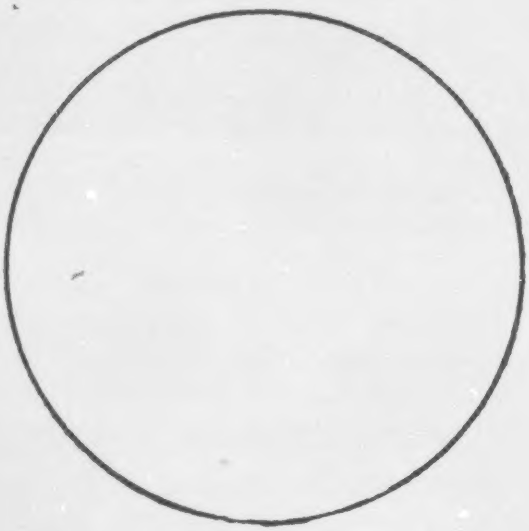
Material(s): Student worksheets and scissors.

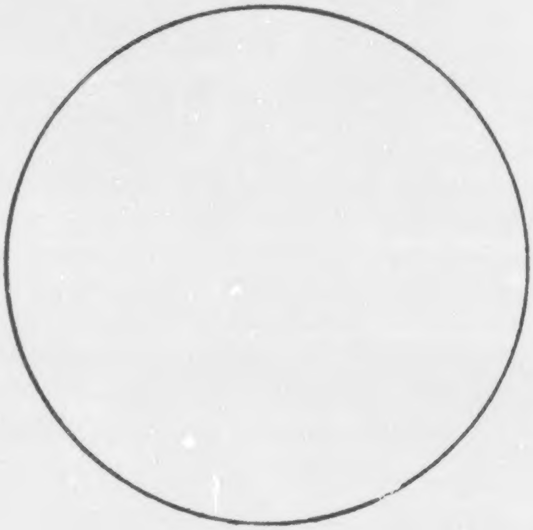
Method: You will need two geometric figures of each type for every student if you use all the activities, also, scissors so they can cut up these figures.

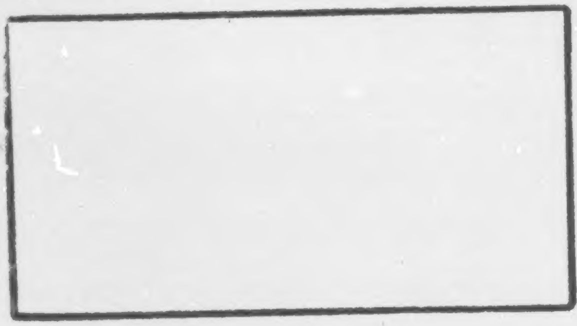
Please make the figures at least as big as the following examples, possibly four to a sheet.

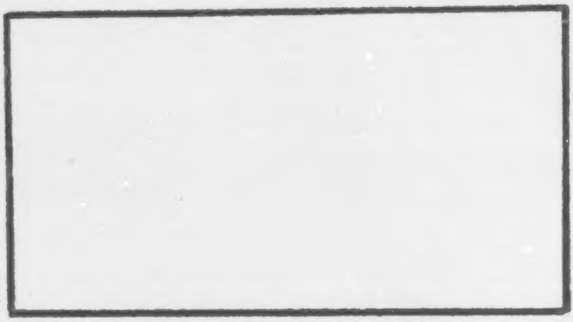


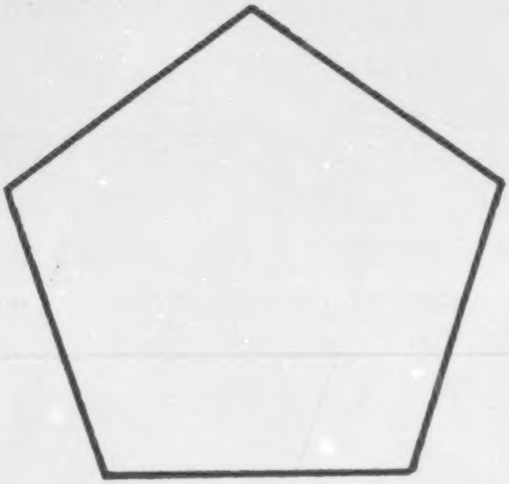


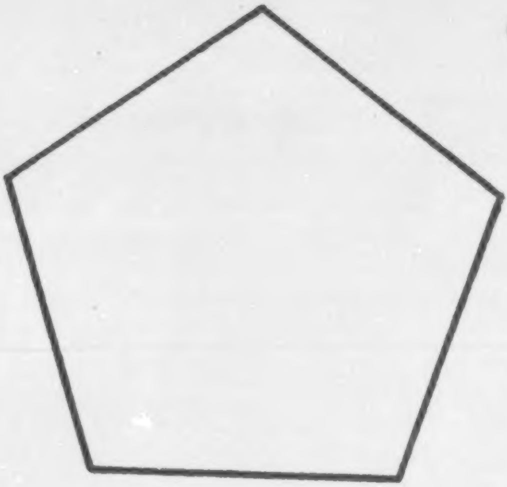










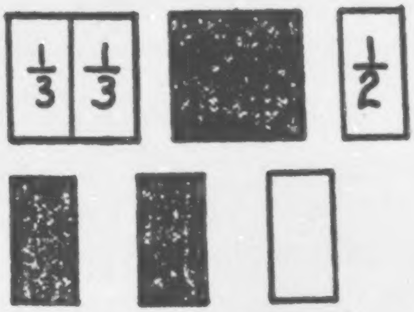


Solution(s): I. 2. $\frac{1}{2}$ 3. 2 4. $\frac{1}{2} \times 2 = 1$

II. 2. $\frac{1}{4}$ 3. 4 4. $\frac{1}{4} \times 4 = 1$

III. 2. $\frac{1}{3}$ 3. 3 4. $\frac{1}{3} \times 3 = 1$

IV. 2. $\frac{2}{3}$ 4.



5. $\frac{2}{3} \times 1\frac{1}{2} = 1$

or

$\frac{2}{3} \times \frac{3}{2} = 1$

With the three pieces of the original rectangle, the space drawn on the worksheet can be covered $1\frac{1}{2}$ times or $\frac{3}{2}$.

V. 2. $\frac{3}{5}$ 4. $1\frac{2}{3}$ or $\frac{5}{3}$ 5. $\frac{3}{5} \times 1\frac{2}{3} = 1$

or

$\frac{3}{5} \times \frac{5}{3} = 1$

VI. 2. $\frac{7}{10}$ 4. $1\frac{3}{7}$ or $\frac{10}{7}$ 5. $\frac{7}{10} \times 1\frac{3}{7} = 1$

or

$\frac{7}{10} \times \frac{10}{7} = 1$

VII. 2. $\frac{5}{6}$ 4. $1\frac{1}{5}$ or $\frac{6}{5}$ 6. $\frac{5}{6} \times 1\frac{1}{5} = 1$

or

$\frac{5}{6} \times \frac{6}{5} = 1$

VIII. 2. $\frac{5}{12}$ 4. $2\frac{2}{5}$ or $\frac{12}{5}$ 5. $\frac{5}{12} \times 2\frac{2}{5} = 1$

or

$\frac{5}{12} \times \frac{12}{5} = 1$

Page

9. Common D -- L-40

Material(s): Several geometric figures such as the ones on the activity sheets, rulers, scissors, and a set of attached activities.

Method:

1) Use some oral questions of the following type:
    - a) How many $\frac{1}{8}$'s are there in $\frac{5}{8}$?
    - b) How many $\frac{1}{6}$'s are there in $\frac{5}{6}$?
    - c) How many $\frac{1}{10}$'s are there in $\frac{3}{10}$?
    - d) Etc.
2) Ask the students if these problems could be written as division problems and if so then write what these examples would look like.
3) Give out the geometric figures, scissors, rulers, and the activity sheets.
4) Feel free to make more examples or change any that are given.

Solution(s):

I. 4. 4, 4

II. 4. 7, 7

III. 1. Common Denominator
2. $\frac{3}{4} = \frac{6}{8}$
4. 6, 6

IV. 1. Common Denominator
2. $\frac{2}{3} = \frac{4}{6}$
3. $\frac{1}{2} = \frac{3}{6}$
4. $\frac{4}{3}$ or $1\frac{1}{3}$, $\frac{4}{3}$ or $1\frac{1}{3}$

V. 1. Common Denominator
2. $\frac{5}{6} = \frac{10}{12}$
3. $\frac{1}{4} = \frac{3}{12}$
4. $\frac{10}{3}$ or $3\frac{1}{3}$, $\frac{10}{3}$ or $3\frac{1}{3}$

Page

10. Recognizing and Writing the Rational Identity Element ---- L-41

Material(s): Student activity sheet

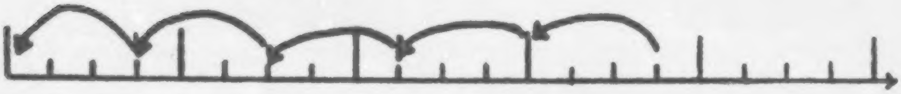
Method: Individual progress

Reference: Levittown Public Schools (4)

11. Getting the Jump on Division ---------------------------- L-42

Material(s): Student activity sheets

Solution(s): 1. a) 3
b) 3
c) 3
d) $\frac{3}{4} + \frac{1}{4}$
2. 3, 8, 24

3.

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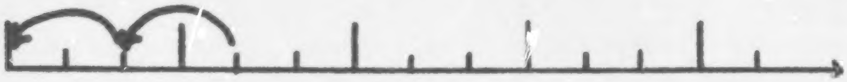
4.

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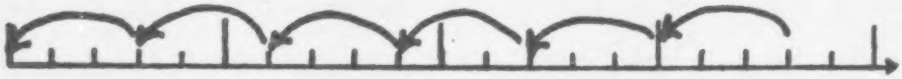
5.

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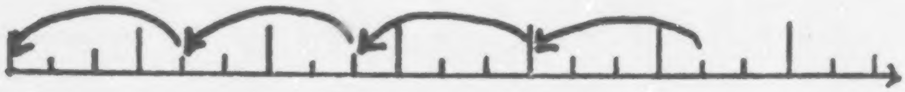
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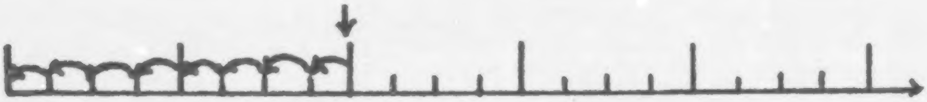
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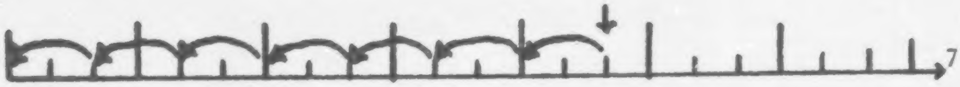
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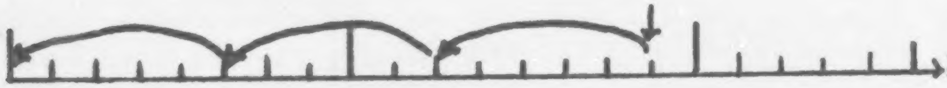
9.

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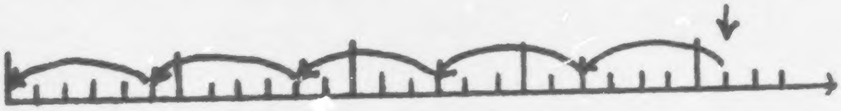
10.

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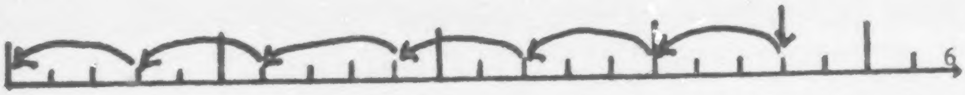
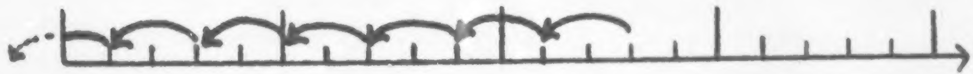

6

12.

EXERCISE	DIVISOR	QUOTIENT	DIVIDEND
7	$\frac{1}{4}$	8	2
8	$\frac{2}{3}$	7	$4\frac{2}{3}$
9	$\frac{5}{8}$	3	$1\frac{7}{8}$
10	$\frac{5}{6}$	5	$4\frac{1}{6}$
11	$\frac{3}{5}$	6	$3\frac{3}{5}$

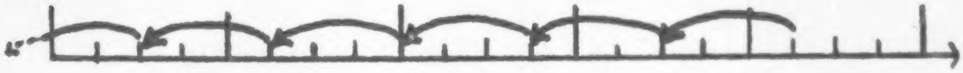
13. 6th and 7th; 6½ jumps.

14.



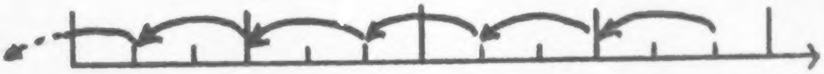
$6\frac{1}{2}$

15.



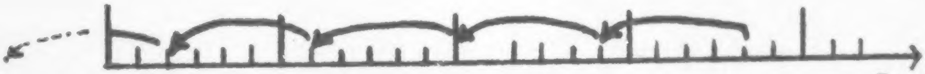
$5\frac{2}{3}$

16.



$5\frac{1}{2}$

17.



$4\frac{2}{5}$

Page

12. Eureka -- None

Material(s): Use a stiff, heavy cardboard or a similar substance to prepare 5" x 7" cards like the one pictured in Method. Be sure you prepare enough so that every student may have one. In making the cards, care should be taken to make certain that every digit 1-9 is used at least once on every card. Also, do not use one digit more than four times. You may choose to allow your students to make their own card and you supply the numbers. It may even prove advantageous to let the student supply his own numbers! Make sure, however, that they follow the above rules. Don't be greatly concerned about where a particular number is to be placed. The actual placement of the number is of relative unimportance.

Next, prepare problems on 2" x 4" cards. Place the answers to each problem on the reverse side of the card. These problems should have the digits 1-9 as answers and should be written large enough to be seen by the students in the back row of the classroom. You need a minimum of four problems with the same answer for every digit. Hence, since there are 9 digits, you need 4 times 9 or 36 questions. It probably would be better to make five or six questions for each digit.

In preparing the problems, choose a particular number system and/or operation and make all of your questions involve that system and/or operation. For example, using the cards as described above, you might choose to make your problems involve division of counting.

Finally, the students must be supplied with some sort of markers to cover the numbers on their cards. You may use circles cut from the same type of material as the student cards or any other suitable substitute.

When each student has a supply of markers and a card, you are ready to start the game.

Method: The rules are very much like those of the popular game, BINGO. The student begins by covering the center square marked with $\boxed{\begin{smallmatrix} - & + \\ \times & \div \end{smallmatrix}}$. This is his "free" square. The teacher then proceeds to draw the problem cards from any suitable container; one at a time. The class is shown the problem for a predetermined length of time (e.g., 5 seconds). The student is asked to look at the problem; determine the answer; and find that answer on his card.

If he finds more than one such answer on his card, he must choose which square he wishes to cover with his marker. He may NOT cover more than one square per problem card shown. If he finds no square containing his answer to the problem, he must wait until the next problem is exposed.

This process is repeated until some student covers 5 numbers on his card either vertically, horizontally, or diagonally. Whereupon, he shouts "EUREKA" or "I've got it." The student's answers are checked against the answers on the reverse side of the problem cards to determine if he is a winner.

Before the next game is started, you may want to allow the students to exchange cards.

VARIATION: New student cards and problem cards could be made for the following operations in the number systems named:

a. Multiplication of fractions
b. Division of fractions
c. Addition of fractions
d. Subtraction of fractions

5	7	7	2	1
6	4	8	9	3
1	8	− + x ÷	3	9
4	9	7	6	2
6	7	4	8	5

You, no doubt, can see many ways of combining two or more of the above suggestions into one game (e.g., addition, subtraction, and division of fractions or addition and subtraction of decimals). Care must be exercised in combining games to avoid questions whose answers are not on any of the cards!

Reference: GIMMICKS (2)

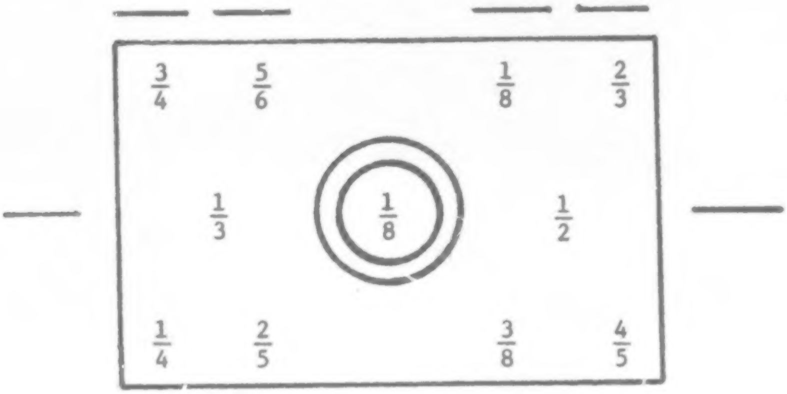
Page

13. Bull's Eye -- None

Material(s): Make a dittoed sheet with the configuration shown below.

Method: Pass out the dittoed sheet. Instruct the students to either multiply or divide each of the fractions in the rectangle by the number in the "bull's eye."

This can be made into a game by giving a point for each correct answer. The highest total wins. Individual students may compete against one another or you may use teams of students. To make it more exciting, place a time limit on each game.



VARIATIONS: The configuration may be placed on the overhead projector with the "bull's eye" number omitted. The students are given similar dittoed sheets. The teacher then places a number in the "bull's eye" and the game begins. Additional games can be played by simply changing the "bull's eye" number.

This game may be played using addition and subtraction. However, extreme care must be exercised by the teacher in choosing the numbers in the rectangle and the "bull's eye" when subtraction is used so that no negative fractions are involved.

This game also lends itself nicely to the use of decimals instead of fractions.

Reference: GIMMICKS (2)

Page

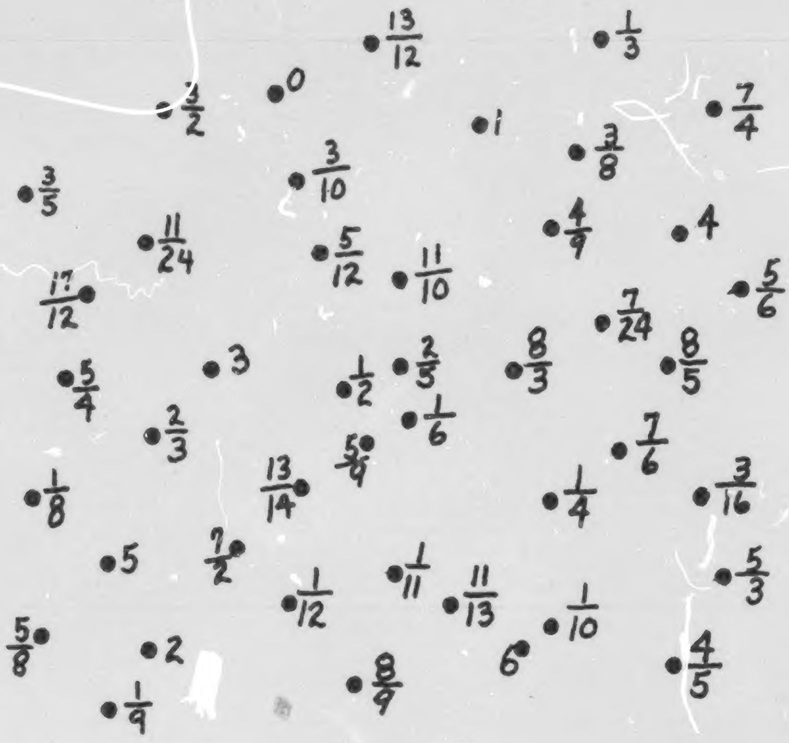
14. St. Patrick's Day Fun ------------------------------------ L-43

Material(s): Student activity sheet

Method: Pass out a copy of St. Patrick's Day Fun to each student. The worksheet which follows contains a variety of problems. If one or two of the problems on the worksheet are unsatisfactory, you need only change the undesired problem(s) and place the new answer(s) in the dotted array. (A section of drill problems in a textbook is an excellent source of replacement problems.) A worksheet with only the array of dots has been included as the student activity sheet so that you may use any type of problems you wish. To fill in the array, place the correct answers to your problems in the proper places. (Complete the worksheet which follows to find the proper dots for each answer.) Then, just fill in any answers you choose for the dots which are not used in making the picture.

The problems are to be solved in numerical order. When the solutions to problems 1 and 2 are determined, draw a line from the answer for problem 1 to the answer for problem 2 in the dotted array. Then determine the answer for each succeeding problem, each time connecting that answer with the answer to the preceeding problem.

Reference: GIMMICKS (2)


$\frac{13}{12}$
$\frac{1}{3}$
0
$\frac{1}{2}$
$\frac{7}{4}$
1
$\frac{3}{8}$
$\frac{3}{10}$
$\frac{3}{5}$
$\frac{4}{9}$
4
$\frac{11}{24}$
$\frac{5}{12}$
$\frac{11}{10}$
$\frac{5}{6}$
$\frac{17}{12}$
$\frac{7}{24}$
$\frac{5}{4}$
3
$\frac{1}{2}$
$\frac{2}{5}$
$\frac{8}{3}$
$\frac{8}{5}$
$\frac{2}{3}$
$\frac{1}{6}$
$\frac{5}{9}$
$\frac{7}{6}$
$\frac{13}{14}$
$\frac{1}{8}$
$\frac{1}{4}$
$\frac{3}{16}$
5
$\frac{7}{2}$
$\frac{1}{11}$
$\frac{11}{13}$
$\frac{5}{3}$
$\frac{1}{12}$
$\frac{1}{10}$
$\frac{5}{8}$
2
6
$\frac{4}{5}$
$\frac{8}{9}$
$\frac{1}{9}$

ST. PATRICK'S DAY FUN

1. $\frac{1}{2} \times \frac{1}{5}$
2. $\frac{2}{3} - \frac{1}{2}$
3. $1 \times \frac{1}{4}$
4. $\frac{3}{8} \times \frac{1}{2}$
5. $\frac{2}{5} + \frac{6}{5}$
6. $\frac{7}{2} + \frac{1}{2} \times 1$
7. $\frac{2}{3} \div \frac{3}{2}$
8. $1 - \frac{3}{5}$
9. $1\frac{1}{2} \times \frac{2}{3}$
10. $\frac{4}{3} - \frac{1}{4}$
11. $\frac{1}{2} \times \frac{2}{3} - \frac{1}{3}$
12. $\frac{3}{4} \div \frac{1}{2}$
13. $\frac{5}{8} - \frac{1}{6}$
14. $\frac{5}{3} - \frac{2}{3} \times \frac{1}{2}$
15. $1\frac{1}{2} \div \frac{1}{2}$
16. $\frac{11}{4} - \frac{3}{2}$
17. $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$
18. $\frac{1}{5} \div \frac{1}{5} \div \frac{1}{5}$
19. $\frac{1}{4} \div \frac{1}{8}$
20. $\frac{1}{7} (\frac{1}{3} + \frac{1}{4})$
21. $\frac{2}{3} \times \frac{5}{6}$
22. $\frac{12}{5} \div \frac{5}{2}$

15. Which Is Greater? -- Page L-44

Material(s): Oak tag or construction paper; cards should be duplicated and made into flash-card type cards. Answers can be put on the back of the cards.

Solution(s):

55 minutes or [✓ 1 hour]

1 gallon or [✓ 5 quarts]

1 gallon or [✓ 9 pints]

$\frac{1}{2}$ hour or [✓ 35 minutes]

[✓ $\frac{3}{4}$ hour] or 40 minutes

3 quarts or [✓ 7 pints]

3 ounces or [✓ $\frac{1}{4}$ pound]

7 ounces or [✓ $\frac{1}{2}$ pound]

$\frac{3}{4}$ pound or [✓ 14 ounces]

[✓ 2 pounds] or 30 ounces

12 ounces or $\frac{3}{4}$ pound (they are equal)

[✓ 30 inches] or $\frac{3}{4}$ yard

2 feet or [✓ $\frac{3}{4}$ yard]

$\frac{1}{4}$ yard or [✓ 1 foot]

[✓ 18 ounces] or 1 pound

$\frac{1}{4}$ pound or [✓ 6 ounces]

[✓ $\frac{1}{4}$ yard] or 4 inches

$\frac{3}{4}$ hour or [✓ 50 minutes]

$\frac{1}{4}$ yard or 9 inches (they are equal)

$\frac{1}{2}$ yard or [✓ 20 inches]

4 feet or [✓ 50 inches]

[✓ 34 ounces] or 2 pounds

$\frac{1}{2}$ pound or [✓ 10 ounces]

2 feet or [✓ 26 inches]

[✓ 7 inches] or $\frac{1}{2}$ foot

[✓ 14 inches] or 1 foot

$\frac{3}{4}$ hour or 45 minutes (they are equal)

25 minutes or [✓ $\frac{1}{2}$ hour]

1 hour or [✓ 70 minutes]

[✓ 5 pints] or 2 quarts

[✓ 1 hour] or 50 minutes

[✓ 20 minutes] or $\frac{1}{4}$ hours

100 minutes or [✓ 2 hours]

[✓ 16 inches] or 1 foot

90 minutes or [✓ 2 hours]

28 inches or [✓ 1 yard]

16. Connect The Dots -- Page L-45

Material(s): Student activity sheet

Solution(s):

a. $\frac{1}{6}$

b. $\frac{1}{10}$

c. $\frac{3}{4}$

d. $\frac{5}{6}$

e. $\frac{1}{24}$

f. $\frac{2}{5}$

g. $\frac{1}{4}$

h. $\frac{1}{20}$

i. $\frac{1}{8}$

j. $\frac{1}{2}$

k. $5\frac{1}{2}$

l. $6\frac{11}{12}$

m. $15\frac{1}{8}$

n. $\frac{1}{12}$

o. $\frac{1}{15}$

p. $\frac{6}{35}$

q. $\frac{2}{3}$

r. $\frac{7}{10}$

s. $\frac{3}{16}$

t. 9

u. $\frac{3}{7}$

v. $1\frac{2}{3}$

w. 4

Page

17. Better Homes and Gardens ------------------------------------ L-46

Material(s): Student activity sheet

Solution(s):

	½ No. people	3 times
Ground Beef	$\frac{1}{2}$ lbs.	3 lbs.
Chopped Onion	$\frac{3}{4}$ cup	$4\frac{1}{2}$ cups
Chopped Celery	$\frac{3}{4}$ cup	$4\frac{1}{2}$ cups
Seasoned Tomato Sauce, 8 oz.	$\frac{1}{2}$ can or 40 oz's	3 cans
Condensed Tomato Soup	$\frac{1}{2}$ can	3 cans
Tabasco Sauce	$\frac{1}{16}$ tsp.	$\frac{3}{8}$ tsp.
Salt	$\frac{1}{2}$ tsp.	3 tsps.
Monosodium Glutamate	$\frac{1}{4}$ tsp.	$1\frac{1}{2}$ tsp.
Chile Powder	$\frac{1}{8}$ tsp.	$\frac{3}{4}$ tsp.

Reference: COLAMBA (1)

18. Making Fractions From the Grocery Ads -------------------- L-47

Material(s): Student activity sheet

Solution(s):

	FRACTION	PRICE
a.	$\frac{3}{4}$	.66
b.	$\frac{1}{4}$	.22
c.	$\frac{2}{4}$ or $\frac{1}{2}$	.44
d.	$\frac{1}{5}$	.20
e.	$\frac{2}{5}$	.40
f.	$\frac{3}{5}$	.60
g.	$\frac{4}{5}$	.80
h.	$\frac{5}{5}$ or 1	1.00
i.	$\frac{1}{3}$	.12
j.	$\frac{2}{3}$	.24
k.	$\frac{3}{3}$ or 1	.36

Page

19. FRACTIONAL $ -- L-48

Material(s): Student activity sheet

Solution(s): 1. $\frac{1}{4}$, 25

2. $\frac{3}{4}$, 75

3. $\frac{3}{10}$ of a dollar or 30 cents

4. $\frac{1}{5}$ of a dollar or 20 cents

5. $\frac{4}{5}$ of a dollar or 80 cents

6. 5 7. 95 8. 65

9. 15 10. $\frac{5}{4}$ 11. $\frac{5}{2}$

12. $\frac{7}{4}$ 13. $\frac{8}{5}$ 14. $\frac{19}{5}$

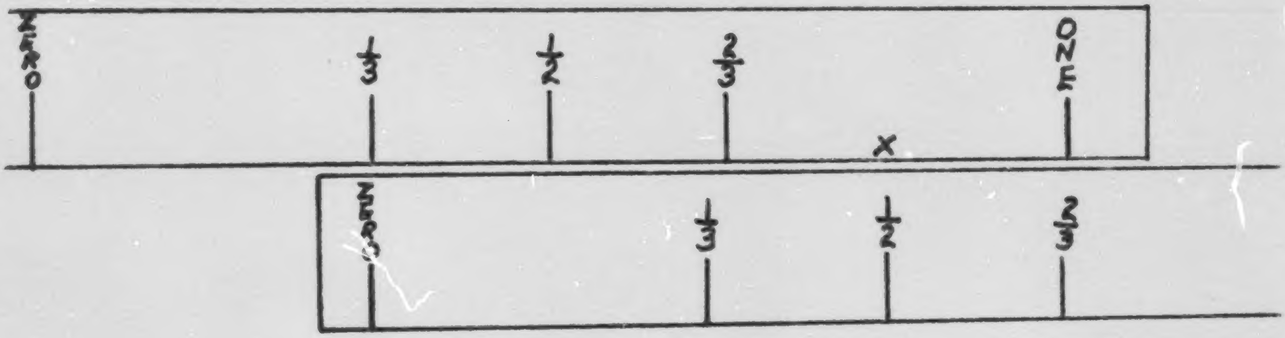
15. 5

Reference: Math Round Up (5)

20. Sliding Rulers -- L-49

Material(s): Student activity sheets, rulers, scissors

Solution(s): 1.

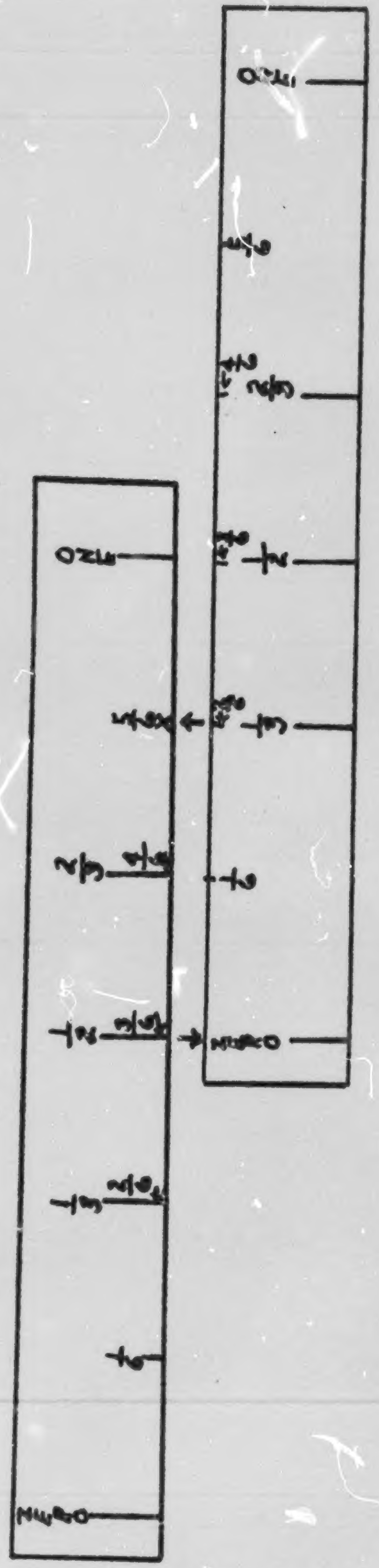

ZERO
$\frac{1}{3}$
$\frac{1}{2}$
$\frac{2}{3}$
X
ONE
ZERO
$\frac{1}{3}$
$\frac{1}{2}$
$\frac{2}{3}$

2. No. We located the point representing $\frac{1}{2} + \frac{1}{3}$ but the point had no name on the number line.

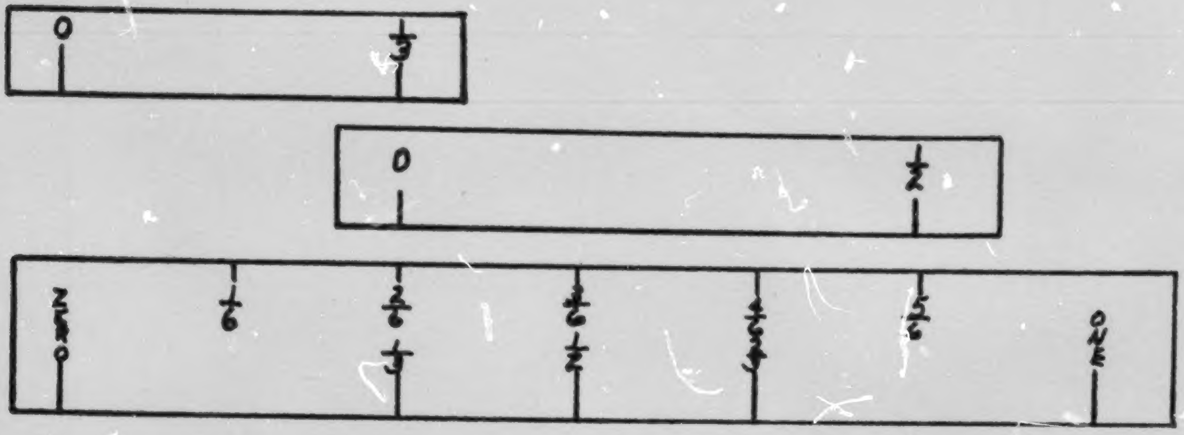
3. a. $\frac{2}{4}$ $\frac{3}{6}$ $\frac{4}{8}$ b. $\frac{2}{6}$ $\frac{3}{9}$ $\frac{4}{12}$

4. Yes, 6.

5.


ONE
ZERO
ONE
ZERO

6.


0
1/3
0
1/2
ZERO
0
1/6
2/6
1/3
3/6
1/2
4/6
2/3
5/6
ONE

7. a) $\frac{1}{12}$ c) $\frac{2}{3}$ e) $\frac{11}{12}$

b) $\frac{1}{2}$ d) $\frac{1}{6}$ f) $\frac{1}{4}$

8. a) P_1 c) J e) H g) K_1

b) M d) E_1 f) N_1 h) R

9. L, M
G_1
$1\frac{5}{12}$

10. F, D
K
$\frac{5}{8}$

11. G, E
M
$\frac{3}{4}$

12. $1\frac{5}{6}$

13. $\frac{7}{4}$ 14. $\frac{5}{3}$ 15. $1\frac{3}{4}$

16. a) $\frac{1}{8}$ c) $1\frac{3}{4}$ e) $1\frac{7}{12}$ g) $\frac{5}{6}$

b) $1\frac{2}{3}$ d) $\frac{1}{3}$ f) $\frac{3}{8}$ h) $1\frac{5}{12}$

17. a) J c) N e) L g) M
b) P_1 d) G f) H_1 h) B_1

18. a) $1\frac{1}{8}$ c) $1\frac{7}{12}$ e) 1 g) $1\frac{1}{12}$
b) $1\frac{1}{12}$ d) $1\frac{3}{4}$ f) $1\frac{5}{12}$ h) $1\frac{3}{8}$

19. a) sum is more than 2
b) no common denominator on scale
c) no common denominator on scale
d) sum is more than 2

20. $\frac{3}{4}$ and $\frac{5}{6}$

$\frac{11}{12}$ and one

21. $1\frac{5}{12}$

21. Rulers in Reverse -- **Page** L-50

Material(s): Student activity sheets, scales from exercise on addition of fractions

Method: Upon completing the exercise, have the students work together in small groups to find a method to subtract fractions using their scales or using two rulers.

Solution(s):
a) $\frac{3}{8}$
b) $\frac{1}{6}$
c) $1\frac{3}{8}$
d) $\frac{1}{6}$
e) $\frac{1}{2}$ and $\frac{7}{12}$ $\frac{1}{6}$
f) $\frac{3}{8}$
g) $\frac{5}{6}$
h) 0 and $\frac{1}{12}$
i) $\frac{1}{12}$

He ate $\frac{3}{4}$ pound.

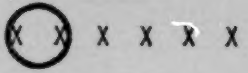
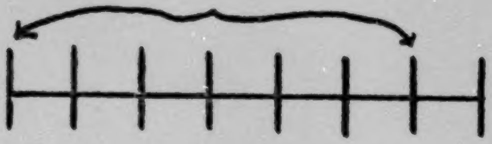
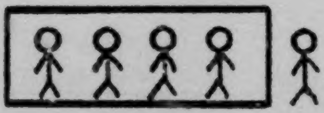
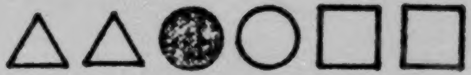
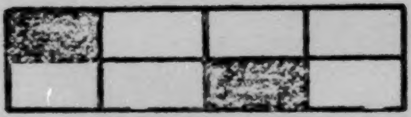
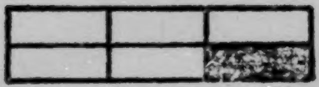
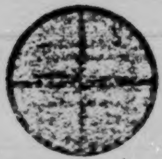
IN WHAT PART ARE WE INTERESTED?

A pair of numbers can be used to describe certain drawings. The number pair is found by:

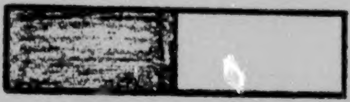
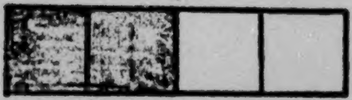
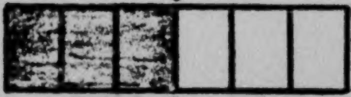
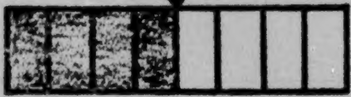
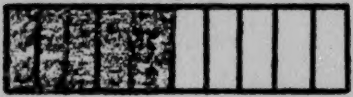
A) Counting the total number of objects, or counting the total number of equal parts of an object (Denominator).

B) From the total, count the number of parts we have shown an "interest in" (Numerator). This can be done by shading, a line drawn around some part of the total, or in many other ways. You can usually tell from the drawing.

Apply these two ideas (above) and complete the missing values. Compare the number we are "interested in" (Numerator) to the total (Denominator) as shown in the first example.

Drawing	Numerator or Interested In	Denominator or Total	Fraction or Comparison
1. 	2	6	$\frac{2}{6}$
2. 	___	___	___
3. 	___	___	___
4. 	___	___	___
5. 	___	___	___
6. 	___	___	___
7. 	___	___	___

IN WHAT PART ARE WE INTERESTED?

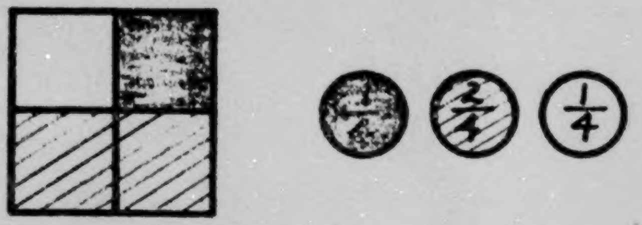
	Drawing	Numerator or Interested In	Denominator or Total	Fraction or Comparison
8.		____	____	____
9.		____	____	____
10.		____	____	____
11.		____	____	____
12.		____	____	____

In the last five problems, what do you observe about the comparison between the number of parts in which we are interested and the number of total parts?

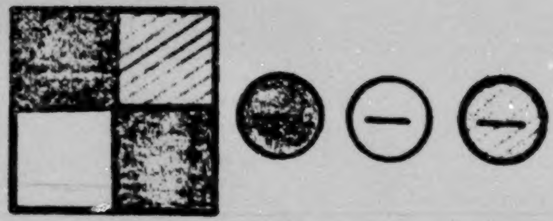
FINDING THE MISSING PARTS

Directions: Look at each large figure. Then, write the fraction represented by the figure for each region in the small circles.

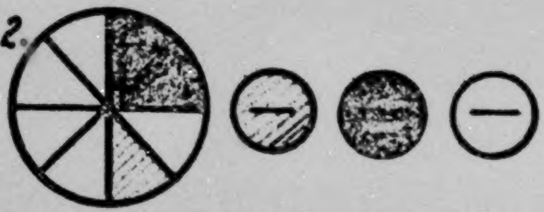
EXAMPLE



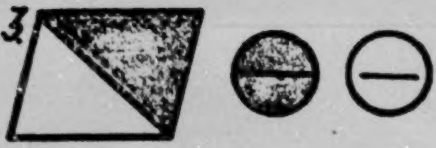
1.



2.



3.



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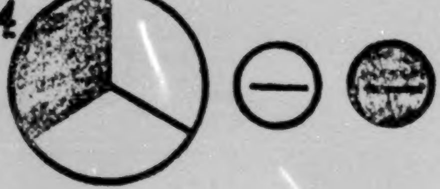

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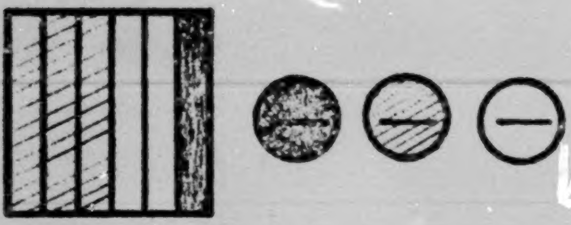

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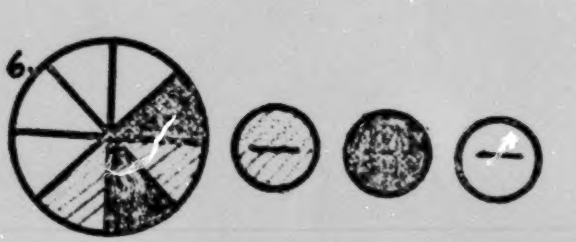
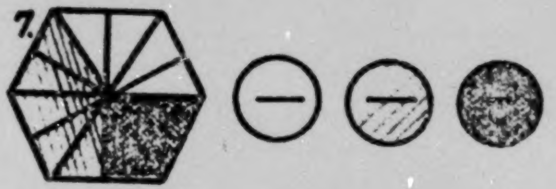


7.



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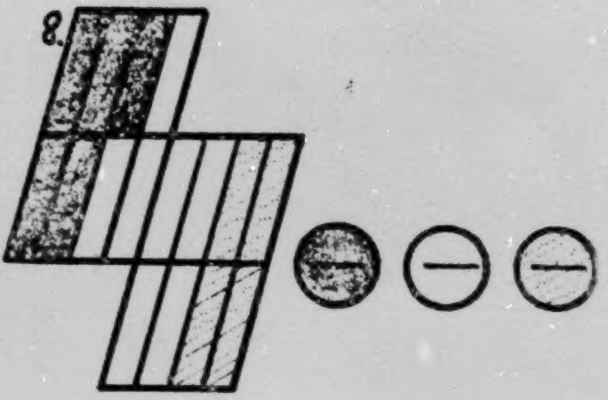
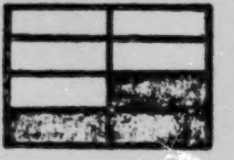
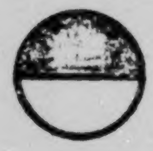
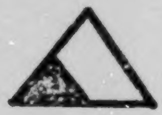
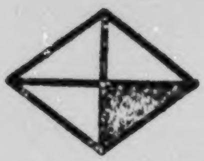
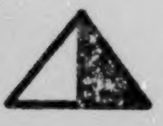
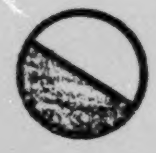
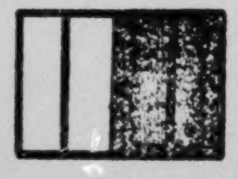
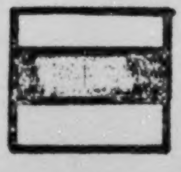
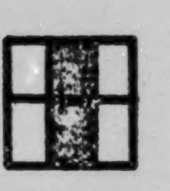
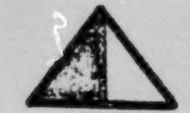
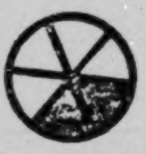
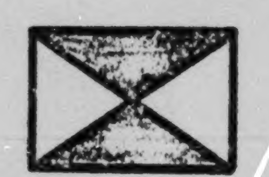


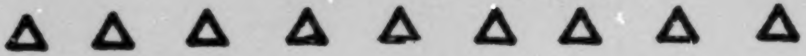
CHOOSING THE CORRECT PART

Put an "X" on the item that is divided into....

$\frac{1}{4}$    

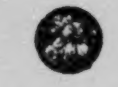
$\frac{1}{2}$    

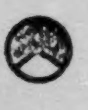
$\frac{1}{3}$    

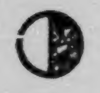


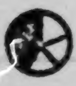
Put at "X" on $\frac{1}{3}$ of the triangles.

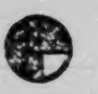
Draw a line from the fraction to the correct figure.

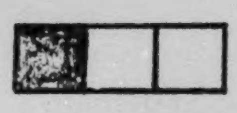
1 

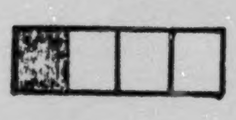
$\frac{1}{2}$ 

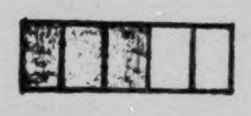
$\frac{2}{3}$ 

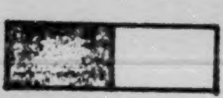
$\frac{3}{4}$ 

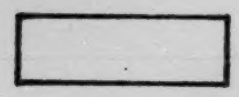
$\frac{2}{5}$ 

One-fourth 

One-third 

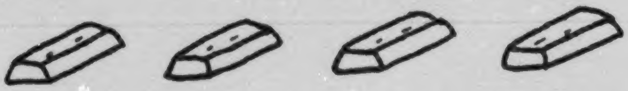
One-half 

One 

Three-fifths 

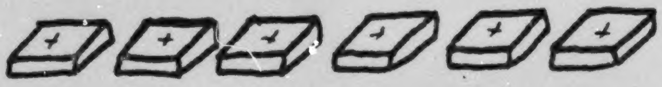
LET'S FIND PARTS

Look at each row of candy bars. Draw a line around $\frac{1}{2}$ of the candy bars.



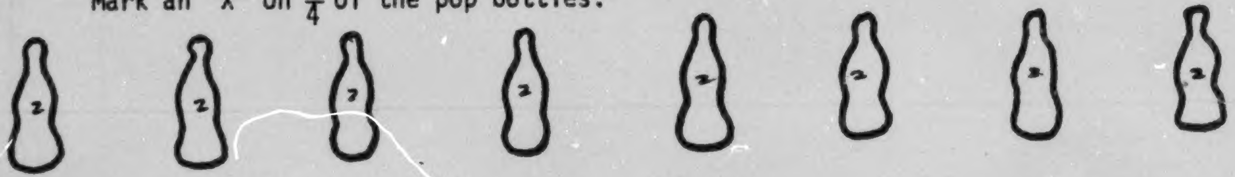
$\frac{1}{2}$ =

Draw a line around $\frac{1}{3}$ of the following.

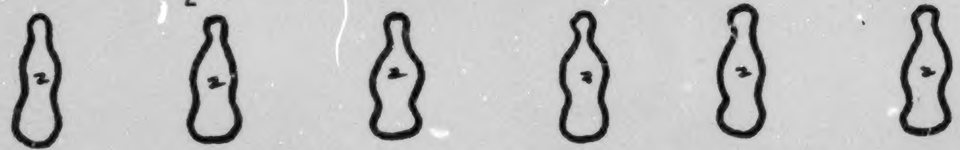


$\frac{1}{3}$ =

Mark an "X" on $\frac{1}{4}$ of the pop bottles.

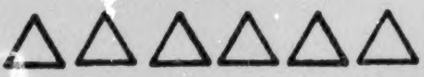


Mark an "X" on $\frac{1}{2}$ of the pop bottles.

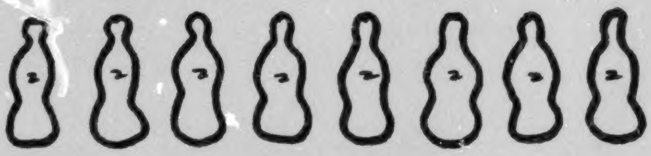


Draw a line around...

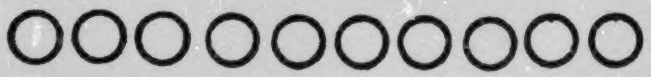
$\frac{2}{3}$ of the triangles



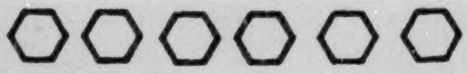
$\frac{3}{4}$ of the bottles



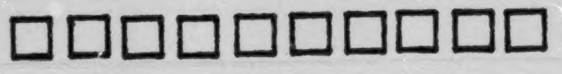
$\frac{2}{5}$ of the circles



$\frac{5}{6}$ of the hexagons

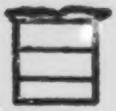


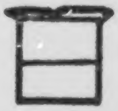
$\frac{3}{5}$ of the squares

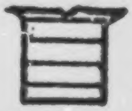


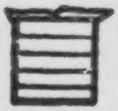
"FILL 'ER UP"

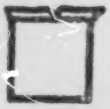
Label the cup used to measure $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, 1, $\frac{1}{4}$ cup.


A


B


C


D


E

J

K

L

M

N

1 pint = 2 cups

1) Draw a line on pint J to show how full it would be if you poured in $\frac{1}{4}$ cup.

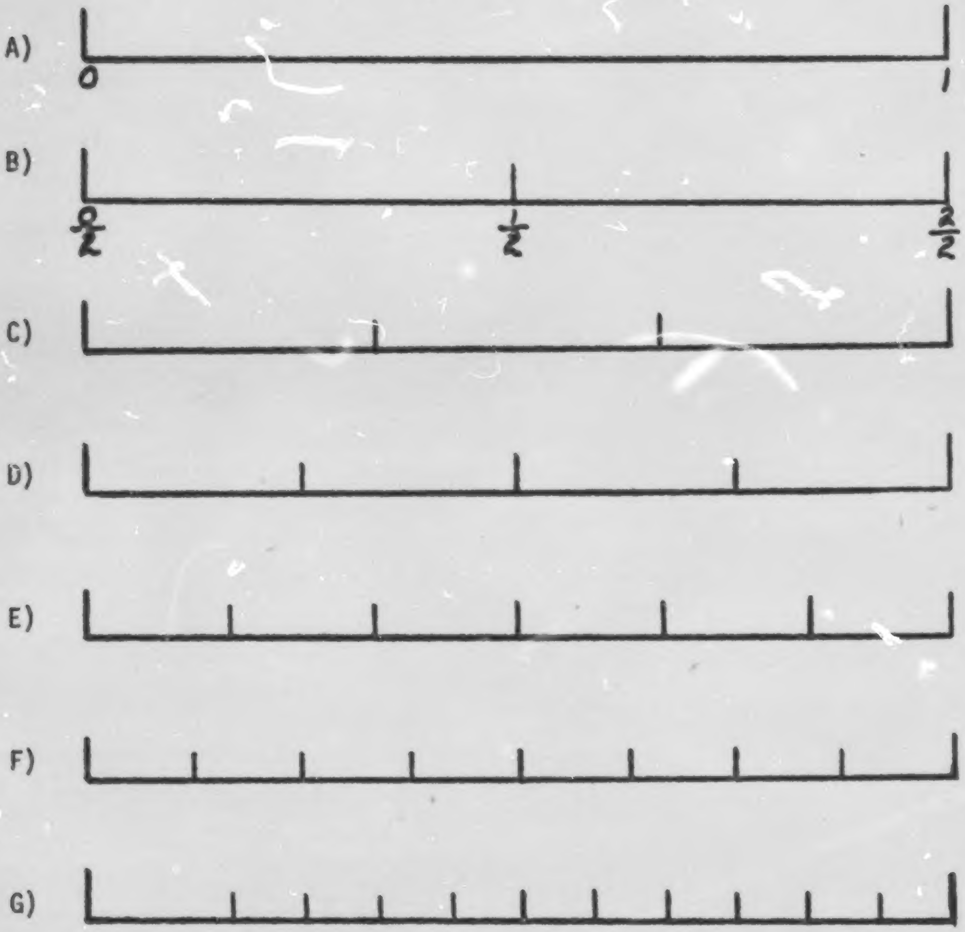
2) Draw a line on pint K to show how full it would be if you poured in $\frac{1}{2}$ cup.

3) Draw a line on pint L to show how full it would be if you poured in 2 cups.

4) Draw a line on pint M to show how full it would be if you poured in $\frac{1}{3}$ cup.

5) Draw a line on pint N to show how full it would be if you poured in $\frac{1}{6}$ cup.

USING THE NUMBER LINE


A)
0
1
B)
$\frac{0}{2}$
$\frac{1}{2}$
$\frac{2}{2}$
C)
D)
E)
F)
G)

1. Into how many equal parts has G been divided?

   Each space is what part of one unit?

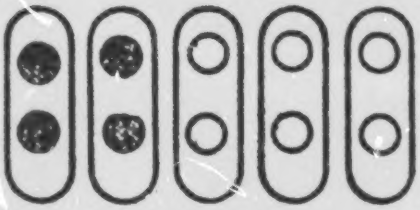
2. Observe how A and B have been labeled and then label lines C through G.

3. On lines C through G, what is another way of naming one?

MAKING EQUAL FRACTIONS

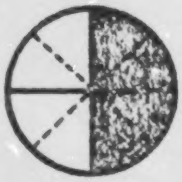
Write a pair of equivalent fractions that are represented by the shaded part of each picture.

1)



____

2)



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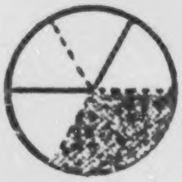
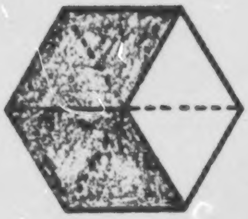
3)



____

4)



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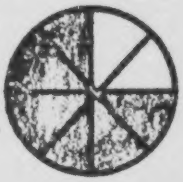
5)



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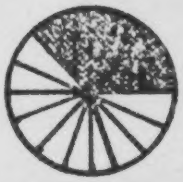
6)



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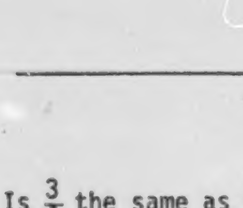
7)



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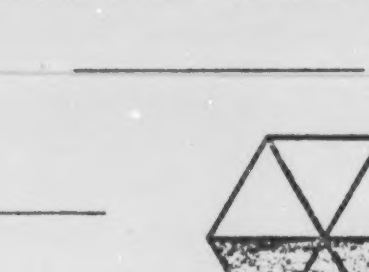
8)



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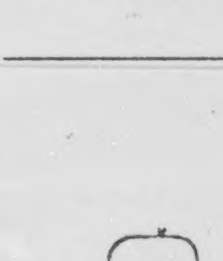
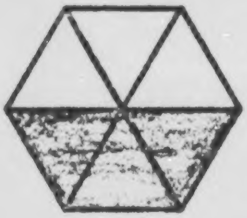
9)



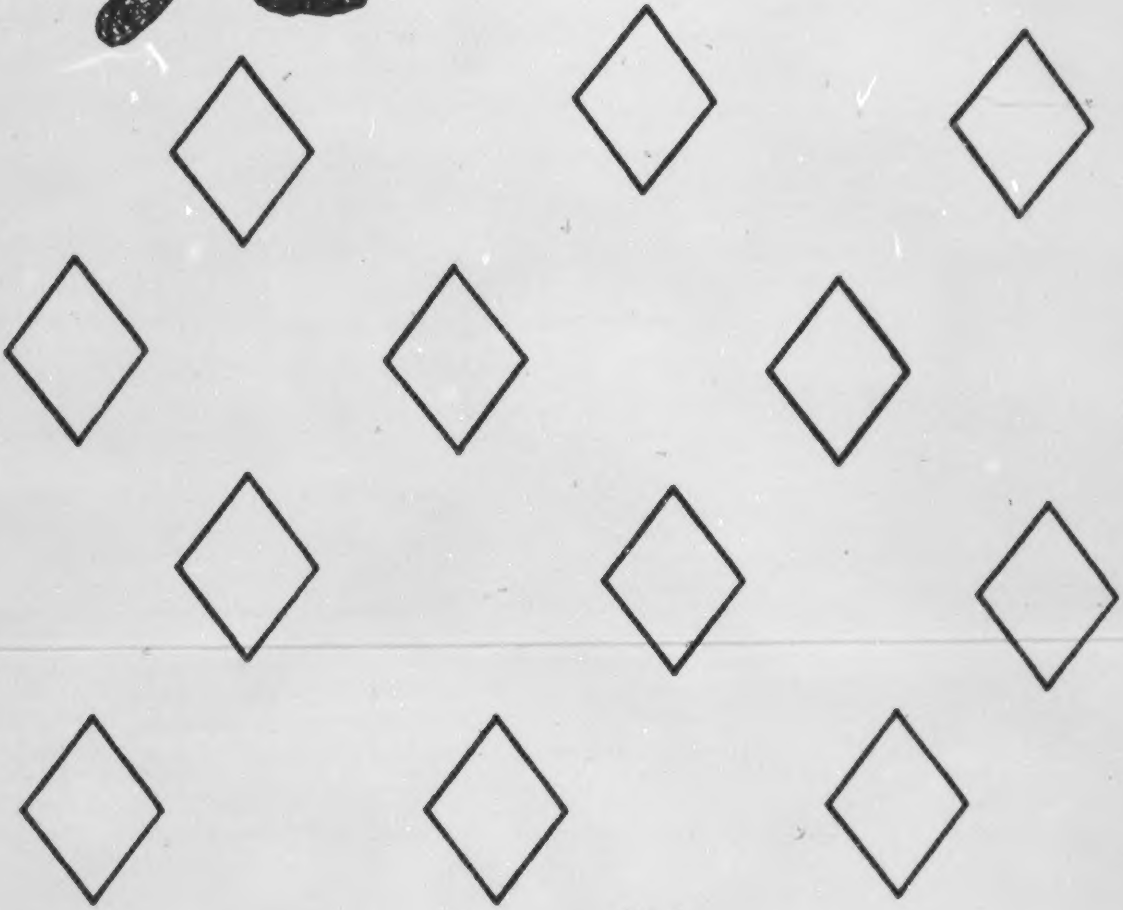
____

10) Is $\frac{3}{6}$ the same as $\frac{1}{2}$? ________________



HOME RUN DERBY

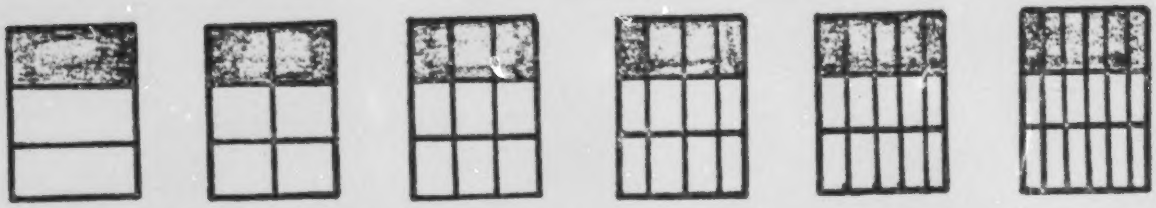
See how many home runs you can score by reducing each fraction to its lowest terms.



EQUIVALENT FRACTIONS

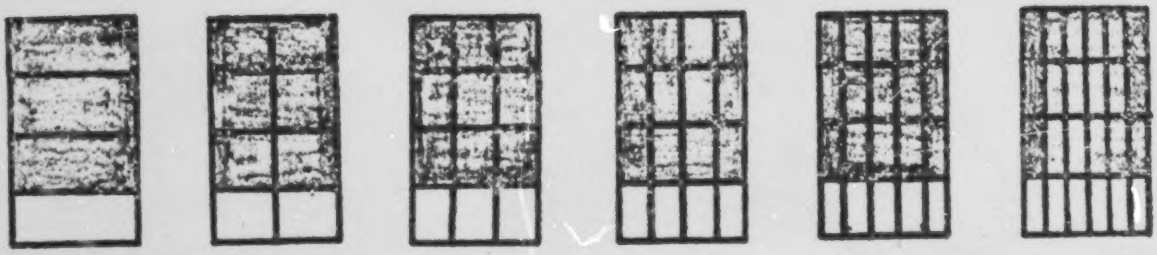
Each row of rectangles contains sets of equivalent fractions represented by the shaded part of the rectangles. Write the fractions on the lines below.

1)



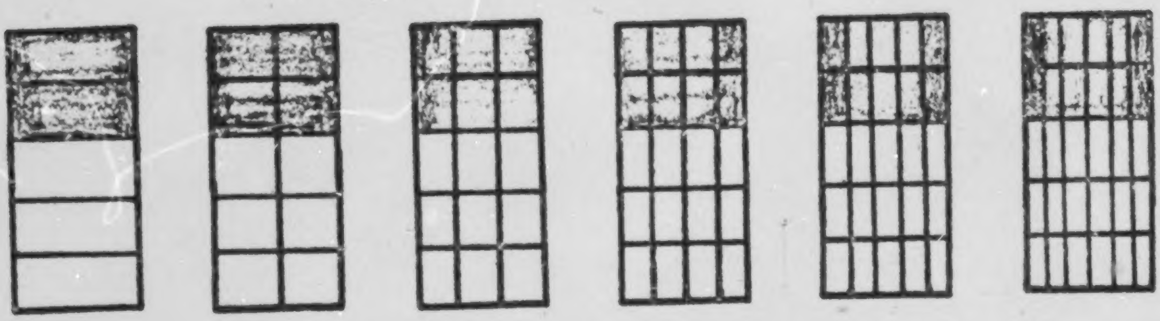
___ ___ ___ ___ ___ ___

2)



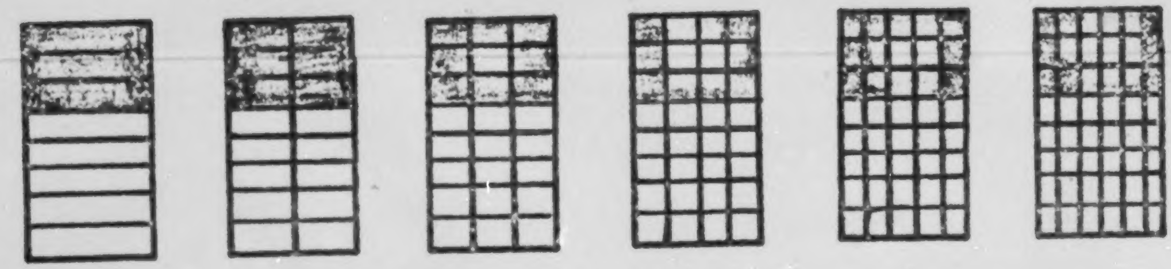
___ ___ ___ ___ ___ ___

3)



___ ___ ___ ___ ___ ___

4)

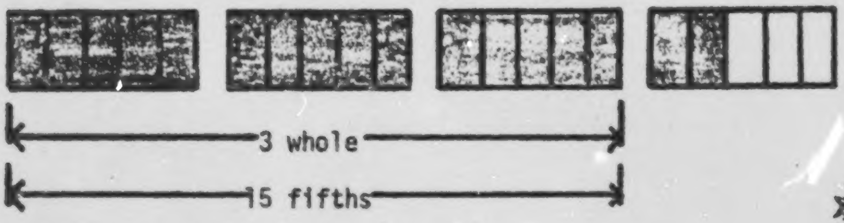


___ ___ ___ ___ ___ ___

Is there a relationship between all the fractions in each row?

WRITING MIXED NUMERALS

Most people find an easy way to rewrite a number when there is a natural number (counting numbers and zero) and a common fraction (we call these mixed numbers). To change $3\frac{2}{5}$ to a fraction, multiply 3 x 5 to get 15, which is the number of 5ths in 3 units. Now, add the 2 extra fifths so you have 17 fifths.



15 fifths + 2 fifths = 17 fifths

We write: $3\frac{2}{5} = \frac{17}{5}$

Supply the missing number in each of these:

a) $2\frac{1}{2} = \frac{(\ \ )}{2}$

b) $3\frac{1}{7} = \frac{(\ \ )}{7}$

c) $14\frac{1}{2} = \frac{(\ \ )}{2}$

d) $10\frac{2}{5} = \frac{52}{(\ \ )}$

e) $\frac{68}{5} = (\ \ )\,\frac{3}{5}$

f) $\frac{9}{4} = 2\frac{(\ \ )}{(\ \ )}$

g) $2\,\frac{45}{10} = \frac{(\ \ )}{10}$

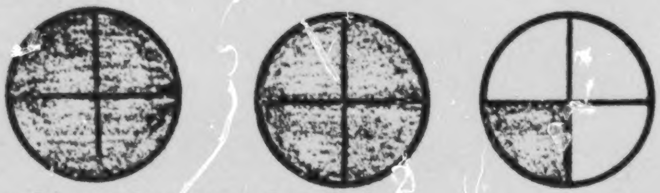
h) $\frac{27}{3} = (\ \ )$

i) $11\,\frac{19}{12} = \frac{(\ \ )}{12}$

j) $(\ \ )\,\frac{(\ \ )}{(\ \ )} = \frac{87}{12}$

FRACTIONS GREATER THAN ONE

What can we do if we wish to work with a fraction where the numerator is greater than the denominator? When would we have such a situation? Well, we might have to feed pizzas to a crowd of people. If there were a crowd, we'd need more than one pizza, but we couldn't afford to give each person a whole pizza. Let's give everyone a quarter of a pizza. We must feed 9 people.



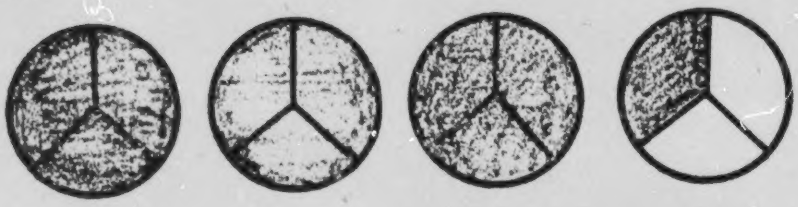
We would use how many fourths?

"$\frac{9}{4}$" Correct!

Could we say 2 complete pizzas and $\frac{1}{4}$ more?

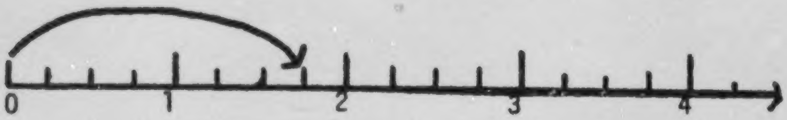
$$2 + \frac{1}{4} \text{ or } 2\frac{1}{4}$$

Example: How would you express these numbers, counting the shaded parts?

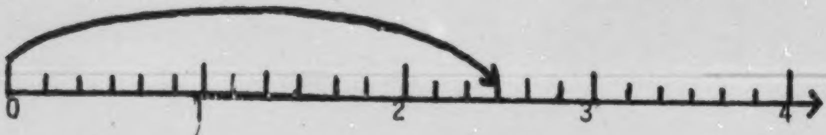


$= 3\frac{1}{3}$ or $\frac{\square}{3}$

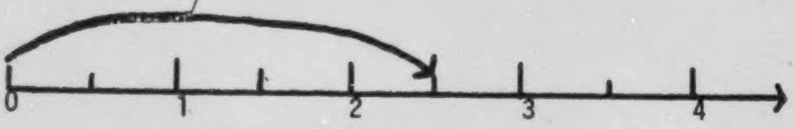
What fractions are shown below on each number line?

1. 

= $\frac{\square}{\square}$ ____ whole units + ____ fourths

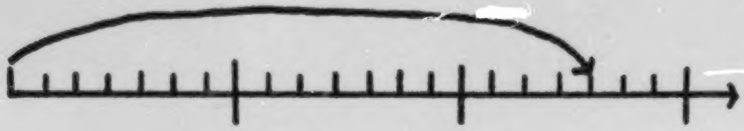
2. 

= $\frac{\square}{\square}$ ____ whole units + ____ sixths

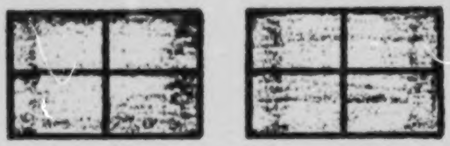
3. 

= $\frac{\square}{\square}$ ____ whole units + ____ halves

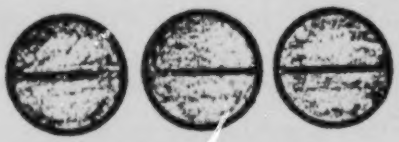
FRACTIONS GREATER THAN ONE

4.  = $\frac{\square}{\square}$ = single objects + ____ seve ths

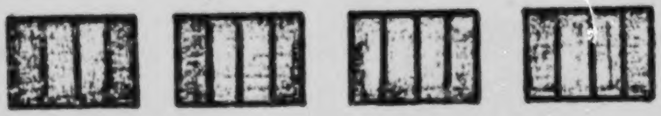
5. Count the number of fourths that are shaded.

 = ____ fourths = $\frac{8}{4}$ = ____ single objects

6. Count the number of halves that are shaded.

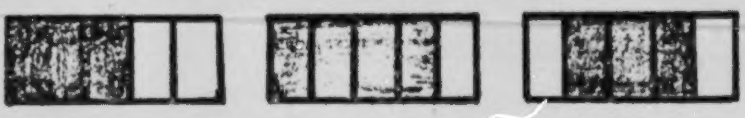
 = ____ halves = $\frac{\square}{\square}$ = ____ single objects

7. Count the number of fourths that are shaded.



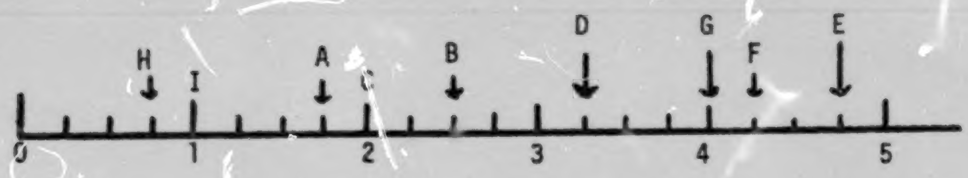
____fourths = $\frac{\square}{\square}$ = ____ single objects

8. Count the number of fifths that are shaded.



____ = $\frac{\square}{5}$ = ____ single objects

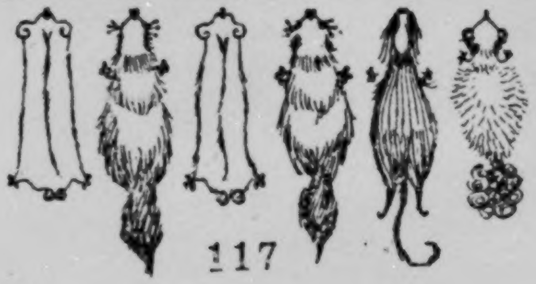
FINDING MIXED NUMBERS



1. Point A above could be located by thinking 1 + _____ = _____. This is called a mixed number. A mixed number is the sum of a natural number (counting numbers and zero), and a fraction.

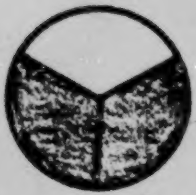
2. Using the number line above, complete the following table.

POINT	MIXED NUMBER	NATURAL NUMBER + PROPER FRACTION
A	$1\frac{3}{4}$	$1 + \frac{3}{4}$
B		
C		
D		
E		
F		
G		
H		
I		

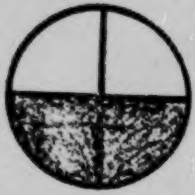


HOW MUCH IS SHADED?

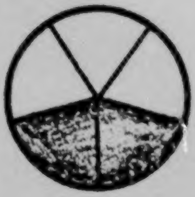
Write the fraction that tells how much of each circle is shaded.



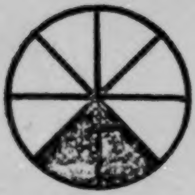
1) __________



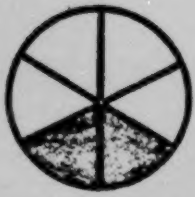
2) __________



3) __________



4) __________



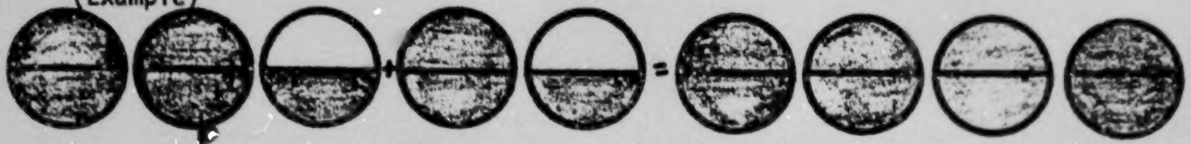
5) __________

6) Arrange these fractions in order from smallest to largest using the < symbol.

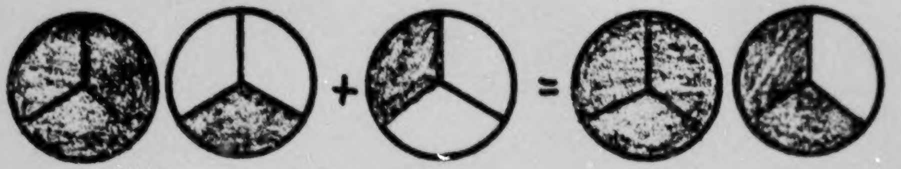
ADDING WITH MODELS AND NUMBER LINES

Each model below shows an addition problem. Use the first as an example.

(Example)

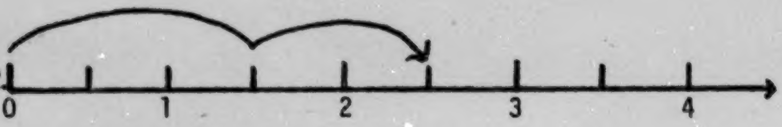


$2\frac{1}{2} + 1\frac{1}{2} = 4$



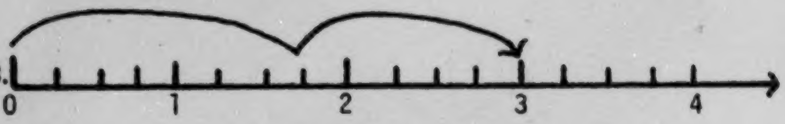
1. __________ + ________ = ____________

2.



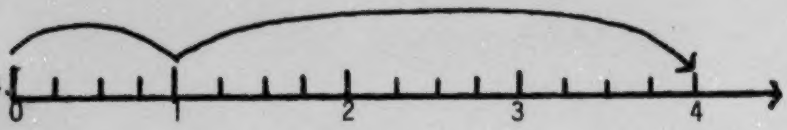
☐ + ☐ = ___

3.



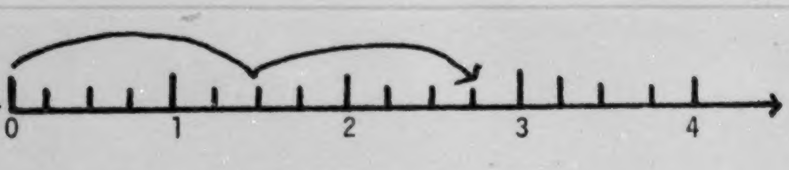
☐ + ☐ = ___

4.



☐ + ☐ = ___

5.



☐ + ☐ = ___

FIND THE MAGIC SQUARES

1.

$2\frac{1}{2}$	$7\frac{1}{2}$	$6\frac{1}{2}$
$9\frac{1}{2}$	$5\frac{1}{2}$	$1\frac{1}{2}$
$4\frac{1}{2}$	$3\frac{1}{2}$	$8\frac{1}{2}$

2.

$4\frac{1}{2}$	$\frac{1}{4}$	$3\frac{1}{4}$
$\frac{3}{4}$	3	$3\frac{1}{4}$
$2\frac{3}{4}$	$3\frac{3}{4}$	$1\frac{1}{2}$

3.

$4\frac{3}{4}$	$9\frac{3}{4}$	$2\frac{3}{4}$
$3\frac{3}{4}$	$5\frac{3}{4}$	$7\frac{3}{4}$
$8\frac{3}{4}$	$1\frac{3}{4}$	$6\frac{3}{4}$

4.

$6\frac{15}{16}$	$11\frac{15}{16}$	$10\frac{15}{16}$
$13\frac{15}{16}$	$10\frac{15}{16}$	$5\frac{15}{16}$
$8\frac{15}{16}$	$7\frac{15}{16}$	$12\frac{15}{16}$

5.

$5\frac{1}{4}$	$\frac{1}{4}$	$7\frac{1}{4}$
$6\frac{1}{4}$	$4\frac{1}{4}$	$2\frac{1}{4}$
$1\frac{1}{4}$	$8\frac{1}{4}$	$3\frac{1}{4}$

6.

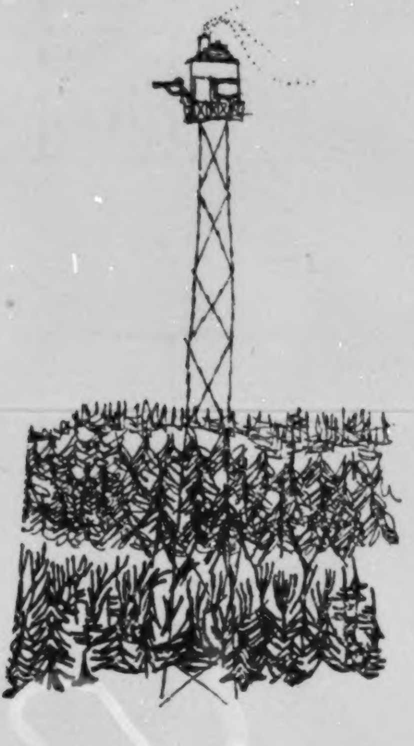
$7\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$
$\frac{1}{8}$	$4\frac{1}{8}$	$8\frac{1}{8}$
$5\frac{1}{8}$	$6\frac{1}{8}$	$1\frac{1}{8}$

ADDING FOR MAGIC

Complete the following Magic Square.

Each sum should equal $26\frac{1}{4}$.

$11\frac{3}{4}$		$9\frac{3}{4}$
	$8\frac{3}{4}$	



SUBTRACTING LIKE FRACTIONS

Bill thought: "Now that I know how to add fractions, I think I know how to subtract fractions. The denominator is the name of how many parts in one object. The numerator tells how many. So, I will subtract the numerators but the denominators will not change."

Examples:

5 apples
- 2 apples
3 apples

5 eighths $\frac{5}{8}$
- 2 eighths $-\frac{2}{8}$
3 eighths $\frac{3}{8}$

4 fifths $\frac{4}{5}$
- 1 fifth $-\frac{1}{5}$
3 fifths $\frac{3}{5}$

1. Now, you do these:

3 fourths $\frac{3}{4}$
- 2 fourths $-\frac{2}{4}$

2 thirds $\frac{2}{3}$
- 1 third $-\frac{1}{3}$

6 sevenths $\frac{6}{7}$
- 4 sevenths $-\frac{4}{7}$

2. Now, see if you can find the differences of the following fractions:

$\frac{4}{5} - \frac{3}{5}$

$\frac{5}{6} - \frac{4}{6}$

$\frac{8}{9} - \frac{5}{9}$

$\frac{7}{8} - \frac{4}{8}$

$\frac{4}{6} - \frac{3}{6}$

$\frac{11}{16} - \frac{6}{16}$

$\frac{7}{9} - \frac{2}{9}$

$\frac{11}{16} - \frac{7}{16}$

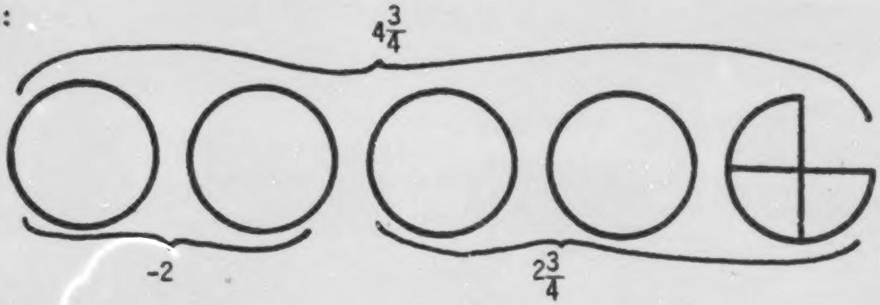
$\frac{11}{12} - \frac{4}{12}$

SUBTRACTING FRACTIONS

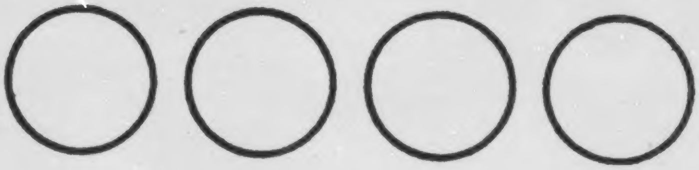
Find the answers to the following subtraction problems. Use diagrams to check your answers.

Example:

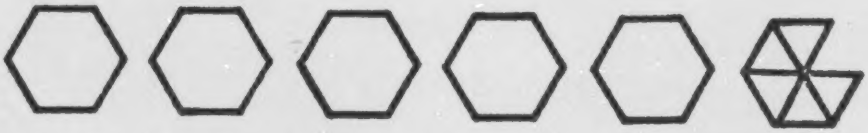
$4\frac{3}{4}$
1) -2



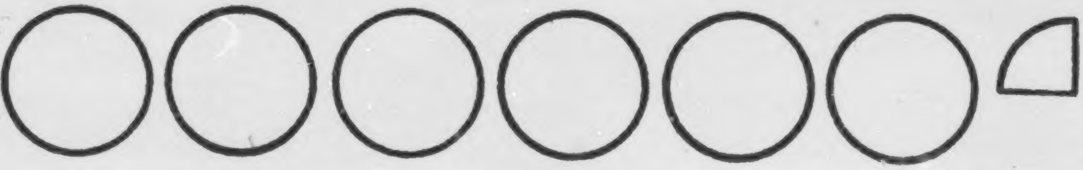
4
2) $-1\frac{1}{4}$



$5\frac{5}{6}$
3) $-3\frac{1}{6}$

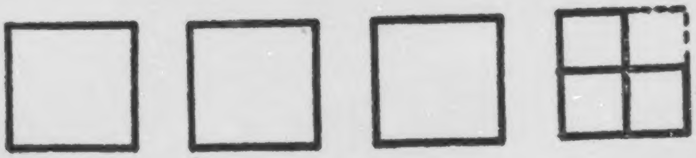


$6\frac{1}{4}$
4) $-1\frac{3}{4}$

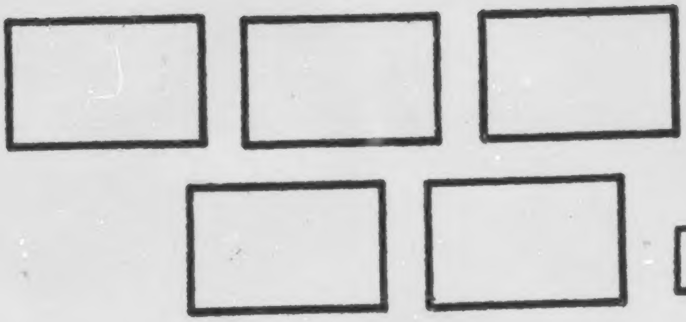


SUBTRACTING FRACTIONS

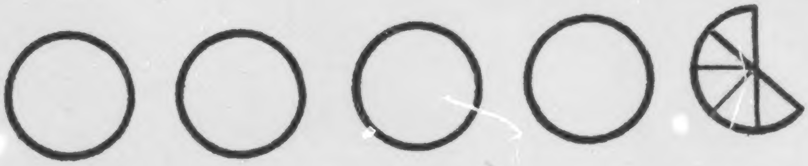
5) $$\begin{array}{r} 3\frac{3}{4} \\ -\ 1\frac{1}{4} \\ \hline \end{array}$$



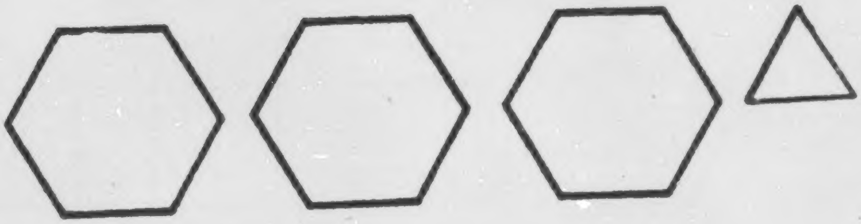
6) $$\begin{array}{r} 5\frac{1}{8} \\ -\ 3\frac{5}{8} \\ \hline \end{array}$$



7) $$\begin{array}{r} 4\frac{5}{8} \\ -\ 1\frac{7}{8} \\ \hline \end{array}$$



8) $$\begin{array}{r} 3\frac{1}{6} \\ -\ \frac{5}{6} \\ \hline \end{array}$$



MORE SUBTRACTING FRACTIONS

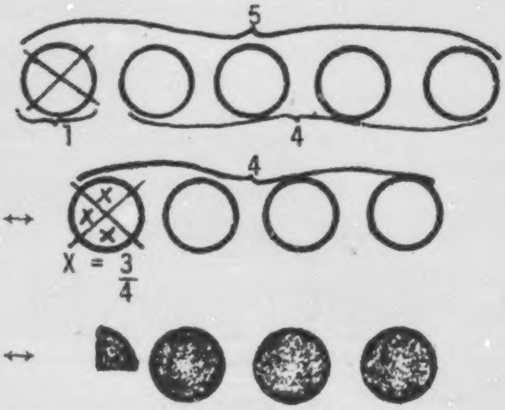
Find the answers to the following subtraction problems by using diagrams as shown in the diagram below.

Example:

$\boxed{5} - \boxed{1}\frac{3}{4}$

$4 - \frac{3}{4} \leftrightarrow$

$3\frac{1}{4} \leftrightarrow$

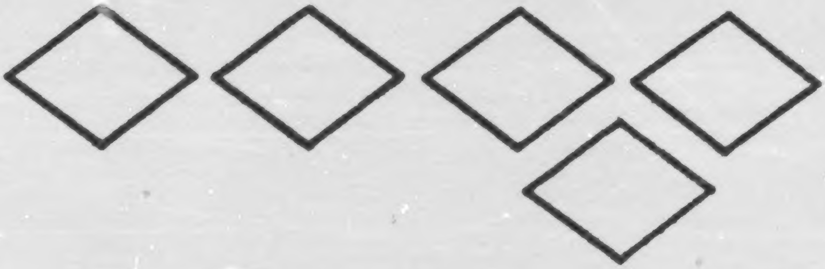


Three separate steps of a diagram have been used to show the example.

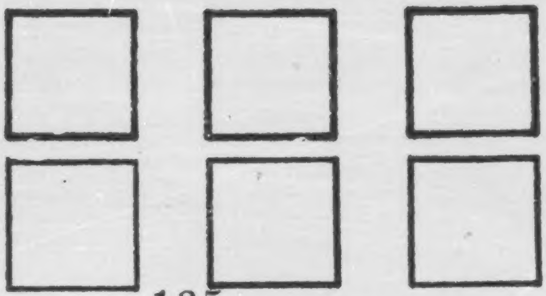
You need only use one diagram to show your work.

1) $3 - 1\frac{1}{2}$

2) $5 - 2\frac{1}{4}$



3) $6 - 3\frac{3}{8}$



MORE SUBTRACTING FRACTIONS

4) $4 - 2\frac{3}{5}$

5) $6 - 1\frac{7}{10}$

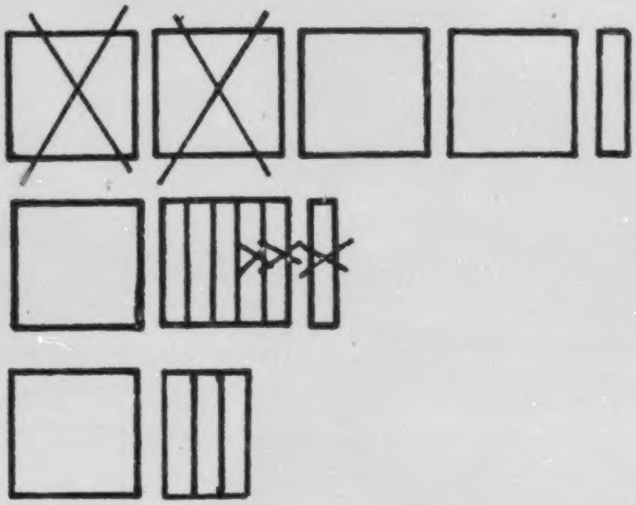
EVEN MORE SUBTRACTING FRACTIONS

Find the answers to the following subtraction problems by using diagrams as shown in the example:

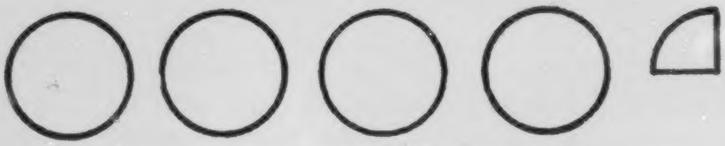
Example: $4\frac{1}{5} - 2\frac{3}{5}$

Three separate steps in a diagram have been used to show the example. $2\frac{1}{5} - \frac{3}{5}$

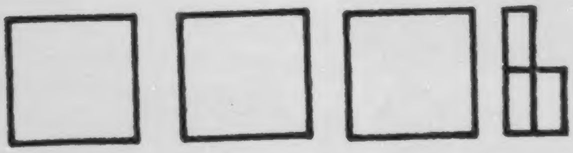
You need use only one diagram to show your work. $1\frac{3}{5}$



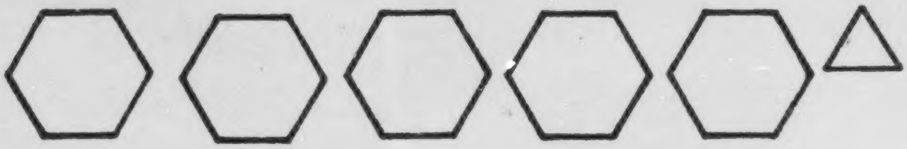
1) $4\frac{1}{4} - 1\frac{3}{4}$



2) $3\frac{3}{8} - 2\frac{7}{8}$

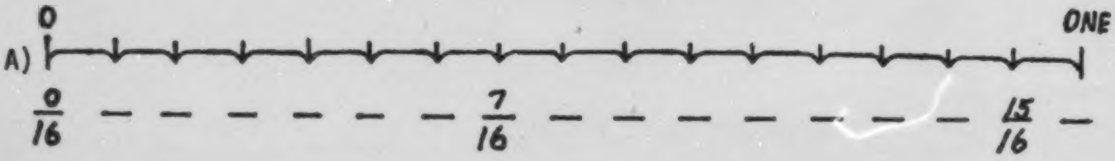


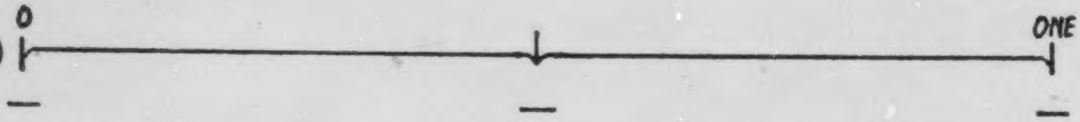
3) $5\frac{1}{6} - 2\frac{5}{6}$

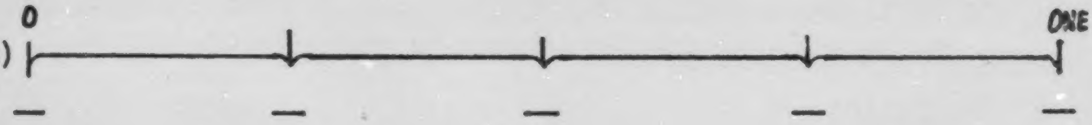


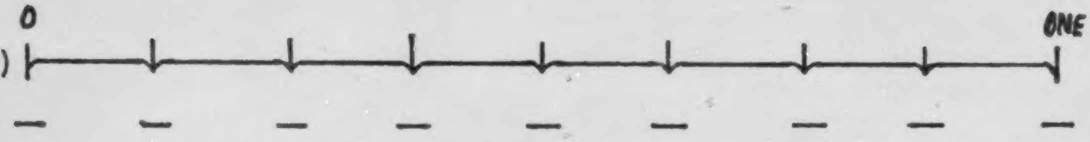
SHOWING FRACTIONAL PARTS ON A NUMBER LINE

Write in all the names of the fractional parts shown on the four number lines below.

A)


B)


C)


D)


1. Find the names of the fractions which are exactly the same part of the line as $\frac{1}{2}$. ______ ______ ______

2. How many 16's are there in $\frac{1}{2}$? $\frac{\quad}{16}$

3. How many 8's are there in $\frac{1}{4}$? $\frac{\quad}{8}$

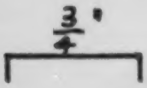
4. What is $\frac{1}{4}$ of line segment A? ______ $\frac{3}{4}$ of A? ______ $\frac{1}{4}$ of D? ______

$\frac{3}{4}$ of D? ______

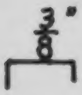
5. $\frac{1}{4}$ of line segment B is between ______ and ______.

FINDING OTHER NAMES FOR A FRACTION

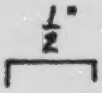
Using your ruler or a number line, find other names for each fraction below.

1. 

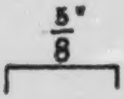
Equivalent to ______, ______

2. 

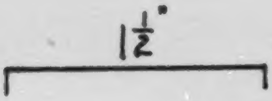
Equivalent to ______, ______, ______

3. 

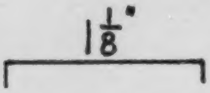
Equivalent to ______, ______

4. 

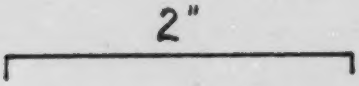
Equivalent to ______, ______, ______

5. 

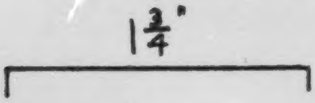
Equivalent to ______, ______

6. 

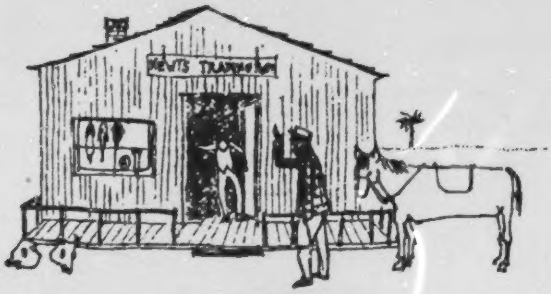
Equivalent to ______, ______, ______

7. 

Equivalent to ______, ______, ______, ______, ___

8. 

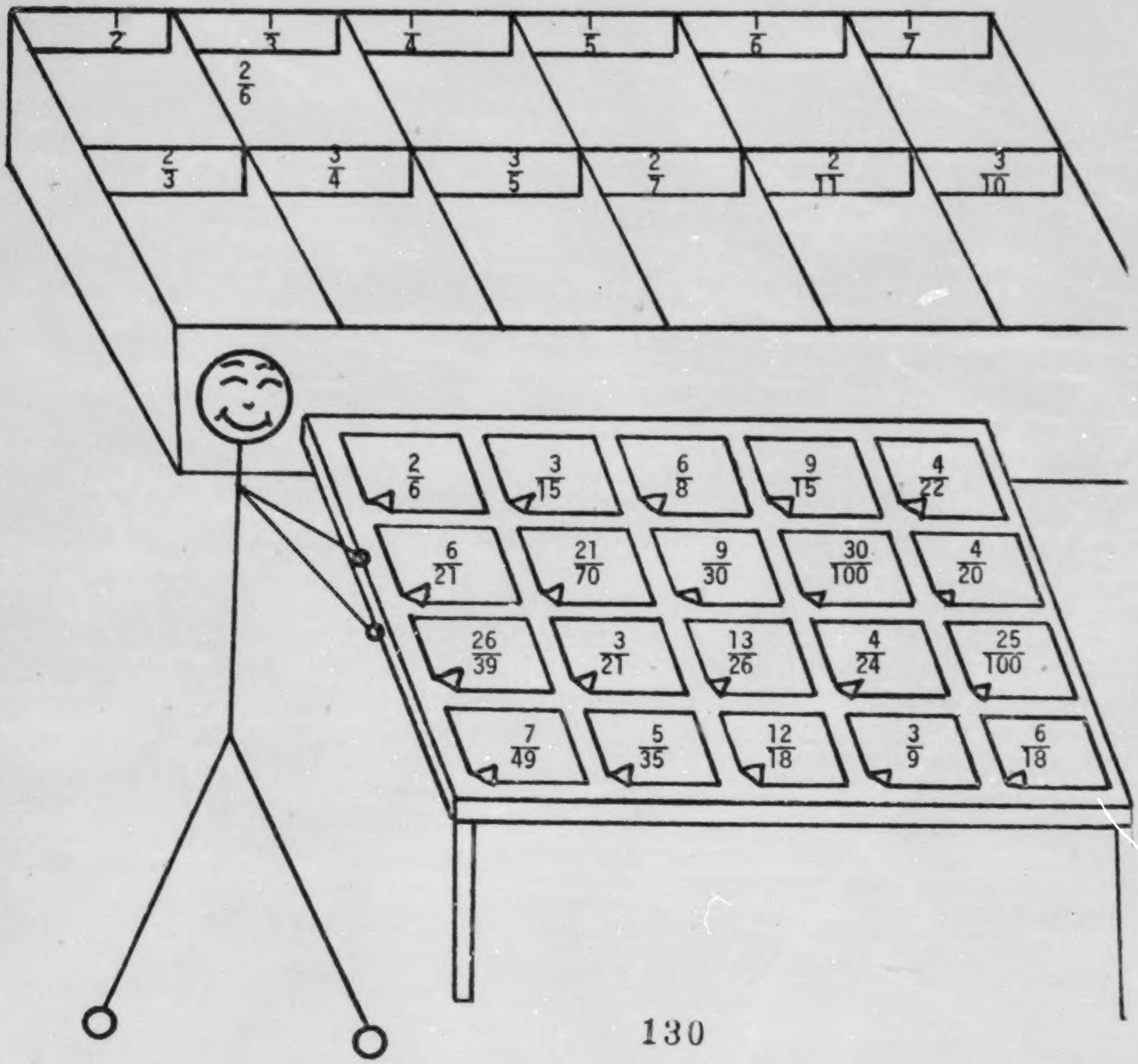
Equivalent to ______, ______, ______, ______, ______



SORTING YELOF'S LIAM

Yelof works in the Liam office. Every day it is his job to sort the liams into bins. The liams are labeled with fractions, and Yelof's job is to place each liam into the bin that is the equivalent of the number on the liam. See if you can do Yelof's job.

Example: Put $\frac{2}{6}$ in the bin marked $\frac{1}{3}$. As you know, $\frac{2}{6} = \frac{2 \times 1}{2 \times 3} = \frac{1}{3}$


1/2
1/3
1/4
1/5
1/6
1/7
2/6
2/3
3/4
3/5
2/7
2/11
3/10
2/6
3/15
6/8
9/15
4/22
6/21
21/70
9/30
30/100
4/20
26/39
3/21
13/26
4/24
25/100
7/49
5/35
12/18
3/9
6/18

WRITING EQUIVALENT FRACTIONS

Use the example below to write equivalent fractions (rename fractions).

Example: $\frac{5}{6} = \frac{\square}{24}$

Solution: $\frac{5 \times (4)}{6 \times (4)} = \frac{\boxed{20}}{24}$ or $\frac{5}{6} \times \frac{4}{4} = \frac{\boxed{20}}{24}$

1. $\frac{1 \times (\quad)}{2 \times (\quad)} = \frac{12}{24}$ or $\frac{1}{2} \times \frac{\square}{\square} = \frac{12}{24}$

2. $\frac{1}{3} \times \frac{\square}{\square} = \frac{4}{12}$

3. $\frac{1}{5} \times \frac{\square}{\square} = \frac{3}{15}$

4. $\frac{5}{6} \times \frac{\square}{\square} = \frac{25}{30}$

5. $\frac{3}{7} \times \frac{\square}{\square} = \frac{21}{49}$

Fill in the missing values for these equivalent fractions...

6. $\{\frac{3}{4}, \frac{\square}{8}, \frac{9}{\square}, \frac{\square}{\square}, \frac{15}{\square}, \frac{\square}{24}, \dots\}$

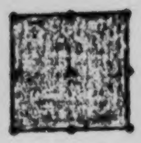
7. $\{\frac{\square}{\square}, \frac{6}{20}, \frac{9}{\square}, \frac{\square}{40}, \dots\}$

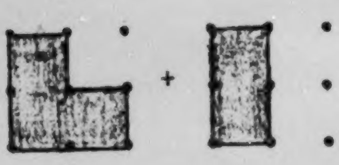
8. Draw a line between pairs of equivalent fractions. One example is given.

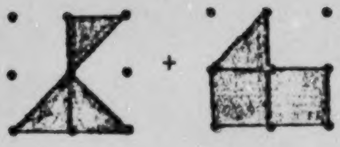
a. $\frac{2}{3}$	$\frac{4}{12}$
b. $\frac{3}{10}$	$\frac{2}{14}$
c. $\frac{3}{4}$	$\frac{4}{6}$
d. $\frac{5}{6}$	$\frac{10}{25}$
e. $\frac{3}{8}$	$\frac{5}{10}$
f. $\frac{1}{7}$	$\frac{6}{20}$
g. $\frac{2}{5}$	$\frac{12}{16}$
h. $\frac{1}{2}$	$\frac{10}{12}$
i. $\frac{1}{3}$	$\frac{9}{24}$

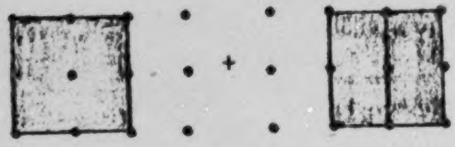
It is easy to compare two fractions if the denominators are equal. That is, it is easy to tell if the two fractions are equal or which is greater.

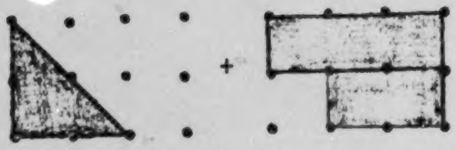
AND MORE FENCES

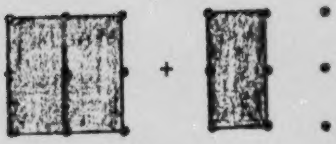
If one is  then...

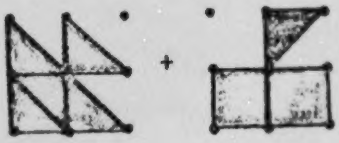
1.  = ____

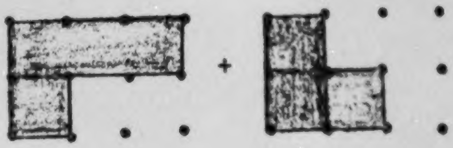
2.  = ____

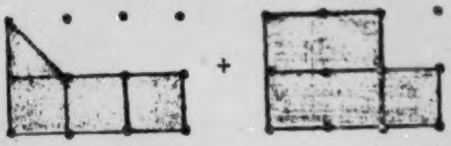
3.  = ____

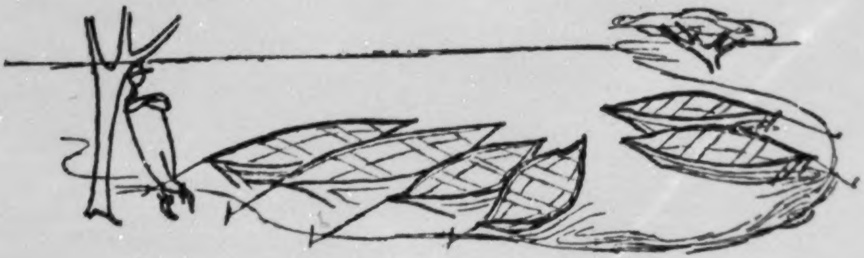
4.  = ____

5.  = ____

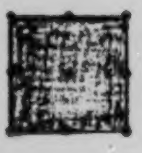
6.  = ____

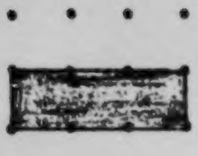
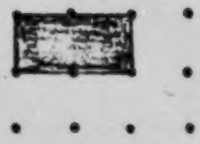
7.  = ____

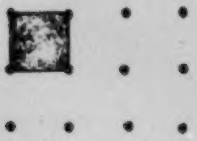
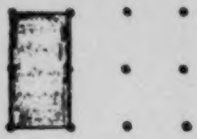
8.  = ____

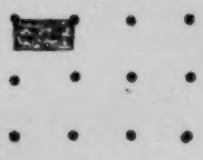
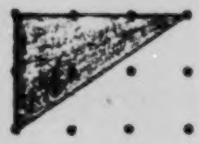


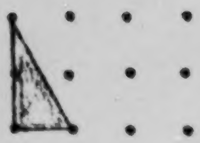
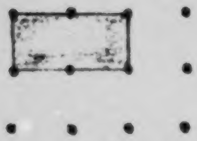
AND MORE FENCES

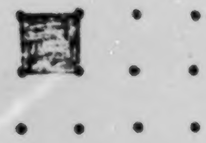
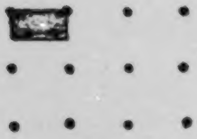
If one is  then

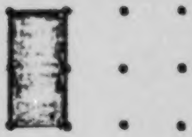
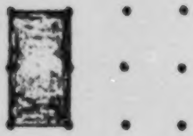
1.  +  = ____

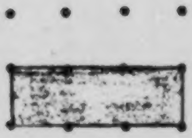
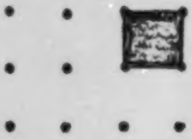
2.  +  = ____

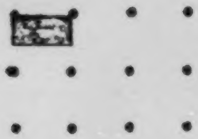
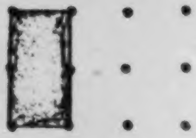
3.  +  = ____

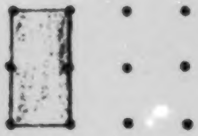
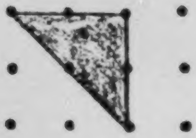
4.  +  = ____

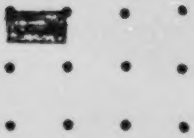
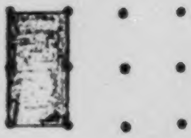
5.  +  = ____

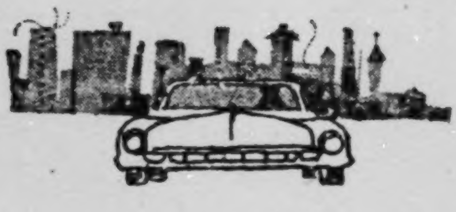
6.  +  = ____

7.  +  = ____

8.  +  = ____

9.  +  = ____

10.  +  = ____



ADDING FRACTIONAL PARTS IN CHART FORM

Complete these charts, using the extended number line on the following page if you need it. LOOK FOR CLUES TO CHECK YOUR ANSWERS!

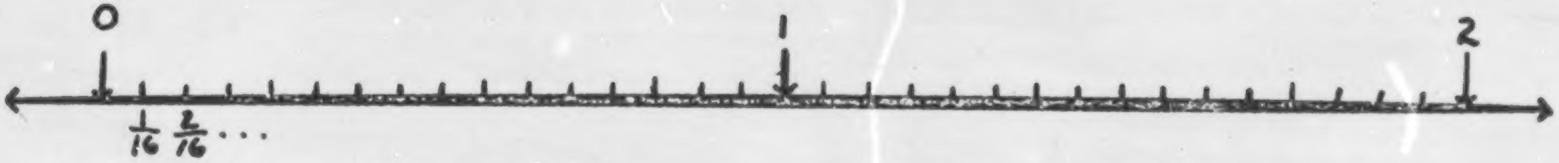
+	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
$\frac{1}{8}$	$\frac{1}{4}$							
$\frac{2}{8}$		$\frac{1}{2}$						
$\frac{3}{8}$			$\frac{3}{4}$					
$\frac{4}{8}$				1				
$\frac{5}{8}$					$1\frac{1}{4}$			
$\frac{6}{8}$						$1\frac{1}{2}$		
$\frac{7}{8}$							$1\frac{3}{4}$	
$\frac{8}{8}$								2

Answers should be in "reduced" form!

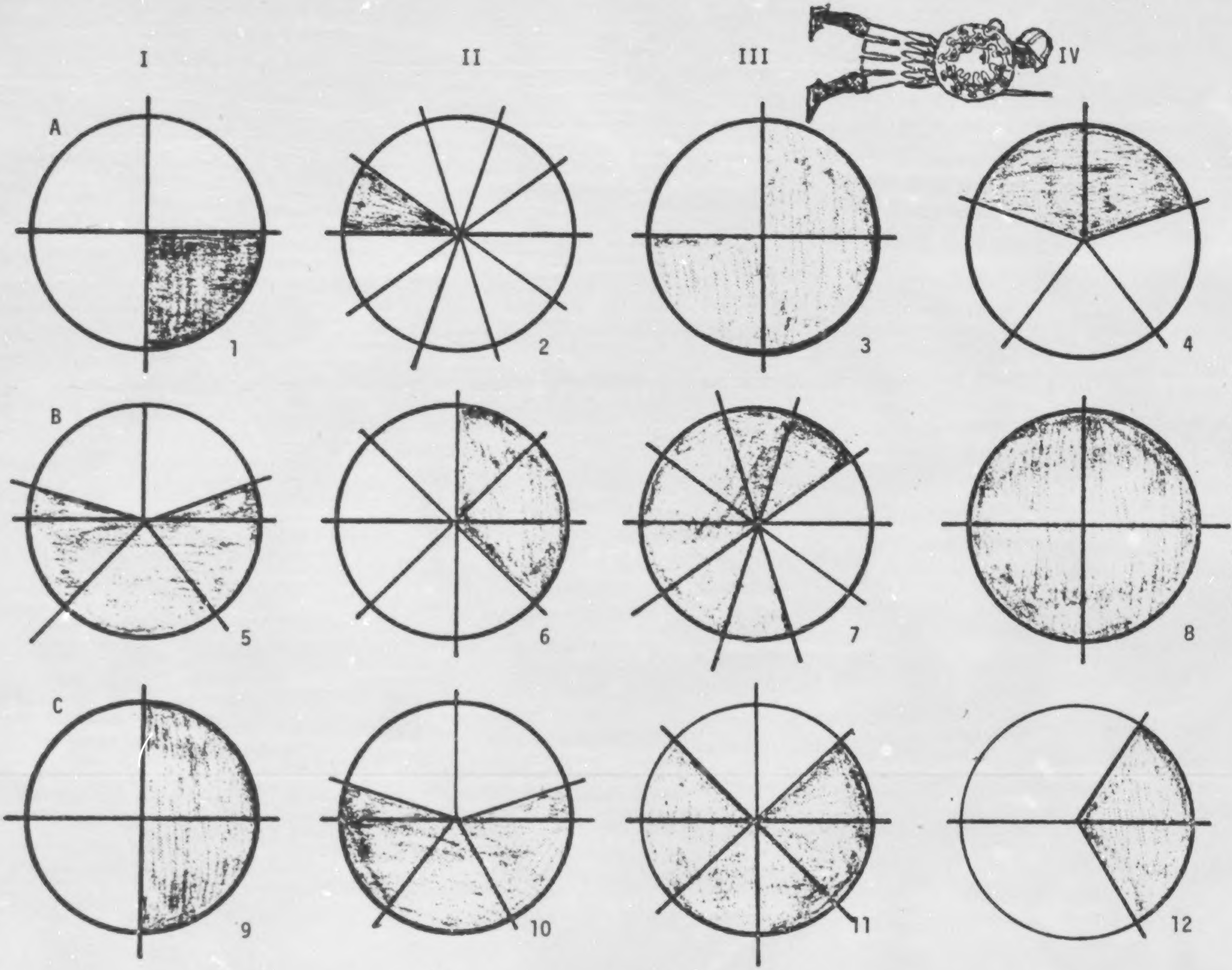
$\frac{1}{2}$							$1\frac{5}{16}$	
$\frac{1}{4}$								
$\frac{1}{8}$								
$\frac{1}{16}$								
+	$\frac{1}{16}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$		$\frac{15}{16}$

ADDING FRACTIONAL PARTS IN CHART FORM

NUMBER LINE


0
1
2
$\frac{1}{16}$ $\frac{2}{16}$ . . .

CIRCLE CHART AND QUIZZES


I
II
III
IV
A
1
2
3
4
B
5
6
7
8
C
9
10
11
12

CIRCLE CHART AND QUIZZES

Circle Chart Quiz 1

Name ______________________________

_____ 1. What is the sum of column 1?

_____ 2. What is the sum of column 2?

_____ 3. What is the sum of column 3?

_____ 4. What is the sum of column 4?

T F 5. Column 1 + circle 1 > $1\frac{1}{2}$.

T F 6. Column 2 + circle 4 > $1\frac{1}{2}$.

F F 7. Column 3 + circle 1 > $2\frac{1}{2}$.

T F 8. Column 4 + circle 8 > 3.

T F 9. Column 1 > column 2.

T F 10. Column 2 > column 3.

Circle Chart Quiz 2

Name ______________________________

_____ 1. What is the sum of row A?

_____ 2. What is the sum of row B?

_____ 3. What is the sum of row C?

T F 4. Row A > row B.

T F 5. Row B > row C.

T F 6. Row C > row A.

T F 7. Row A + circle 1 $\neq$ circle 8 + circle 3.

_____ 8. What is row A + circle 2?

T F 9. Row A + circle 8 $\neq 2\frac{1}{2}$.

T F 10. Row A + circle 1 < $1\frac{3}{4}$.

Circle Chart Quiz 3

Name ______________________________

_____ 1. What is the sum of column 1?

T F 2. Column 1 > row A.

_____ 3. What is the sum of column 2?

T F 4. Column 2 < row B.

_____ 5. What is the sum of column 3?

T F 6. Column 3 > row C.

T F 7. Column 1 + column 2 > column 1 + column 1.

T F 8. Column 2 + column 3 > column 1 + column 1.

_____ 9. What is column 1 + row A?

_____ 10. What is column 2 + row B?

Circle Chart Quiz 4

Name ______________________________

_____ 1. What is the sum of row A?

T F 2. Row A > column 4.

_____ 3. What is the sum of row B?

T F 4. Row B > column 3.

_____ 5. What is the sum of row C?

T F 6. Row C > column 2.

T F 7. Row A + row B > row A + row A.

T F 8. Row B + row C > row A + row A.

_____ 9. What is column 2 + row A?

_____ 10. What is column 3 + row B?

CIRCLE CHART AND QUIZZES

Circle Chart Quiz 5

Name ______________________________

T F 1. Column 1 > column 3.

_____ 2. Column 1 + row A = ?

T F 3. Row A < column 4.

_____ 4. Row A x column 3 = ?

T F 5. Column 2 $\neq$ column 3.

_____ 6. What is the sum of the odd numbered columns?

T F 7. Circle 1 > (circle 10 + circle 11).

T F 8. Circle 6 < (circle 1 + circle 2).

_____ 9. Column 1 + column 2 = ?

_____ 10. Column 3 + column 4 = ?

Circle Chart Quiz 6

Name ______________________________

_____ 1. Column 1 - column 2 = ?

_____ 2. Column 3 - column 4 = ?

_____ 3. Row A + row B = ?

_____ 4. Row C - row A = ?

T F 5. (Row A + circle 8) < row B.

T F 6. (Row B + circle 9) < 3.

T F 7. (Column 1 + circle 1) > row A.

T F 8. (Row A + circle 9) $\neq$ 2.

T F 9. (Column 3 + circle 10) $\neq$ 3.

T F 10. (Column 4 + circle 1) < 2.

Circle Chart Quiz 8

Name ______________________________

_____ 1. Circle 9: circle 1 = circle 8: circle?

_____ 2. Row A: circle 9 = circle 3 :circle?

_____ 3. 15: circle 1 = 45: circle?

_____ 4. 22: circle 9 = 11: circle?

_____ 5. Row A + row B = ?

_____ 6. Row A: row B = 3: ?

T F 7. $\frac{\text{Row A}}{\text{circle 12}} > 3.$

T F 8. Circle 3: circle 8 = circle 6: circle 9.

T F 9. Circle 9: circle 1 = circle 11: circle 6.

T F 10. $\frac{\text{Circle 10}}{\text{circle 9}} > 1$

Circle Chart Quiz 7

Name ______________________________

_____ 1. Column 4 - circle 4 = ?

T F 2. Column 4 + circle 8 > $2\frac{1}{2}$.

_____ 3. Column 3 + circle 1 = ?

T F 4. Column 3 + circle 9 < $2\frac{1}{2}$.

T F 5. (Row A + 7) > 8.

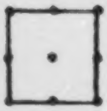
T F 6. ($\frac{1}{2}$row A + 5) > 6.

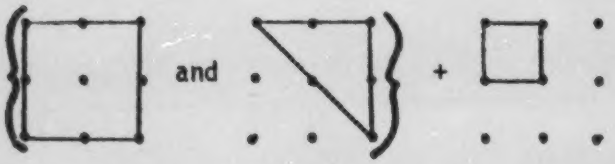
T F 7. Column 3 > row A.

_____ 8. Column 1 + row A = ?

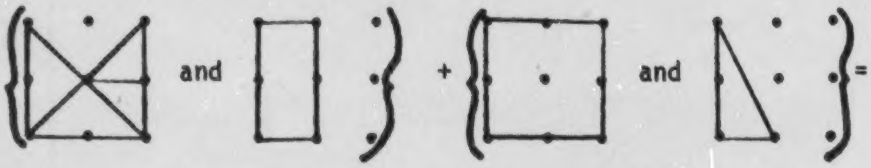
_____ 9. Column 1 + column 4 = ?

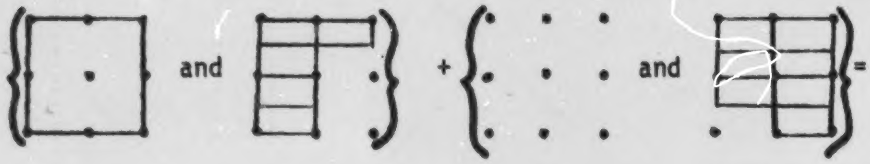
T F 10. Circle 5 + circle 6 > circle 8.

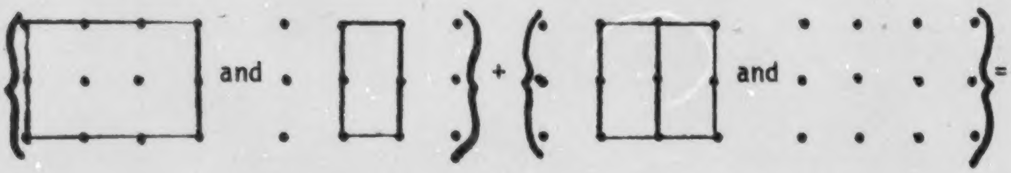
If  IS ONE THEN

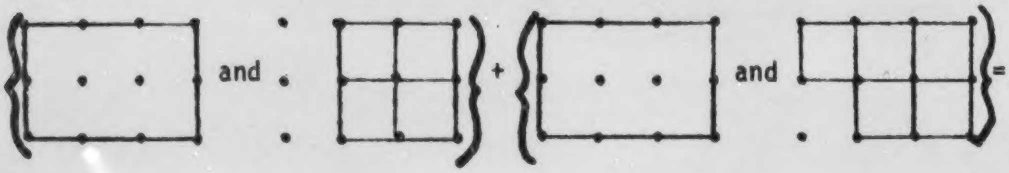
1. 

= $1\frac{1}{2} + \frac{1}{4} = 1\frac{3}{4}$

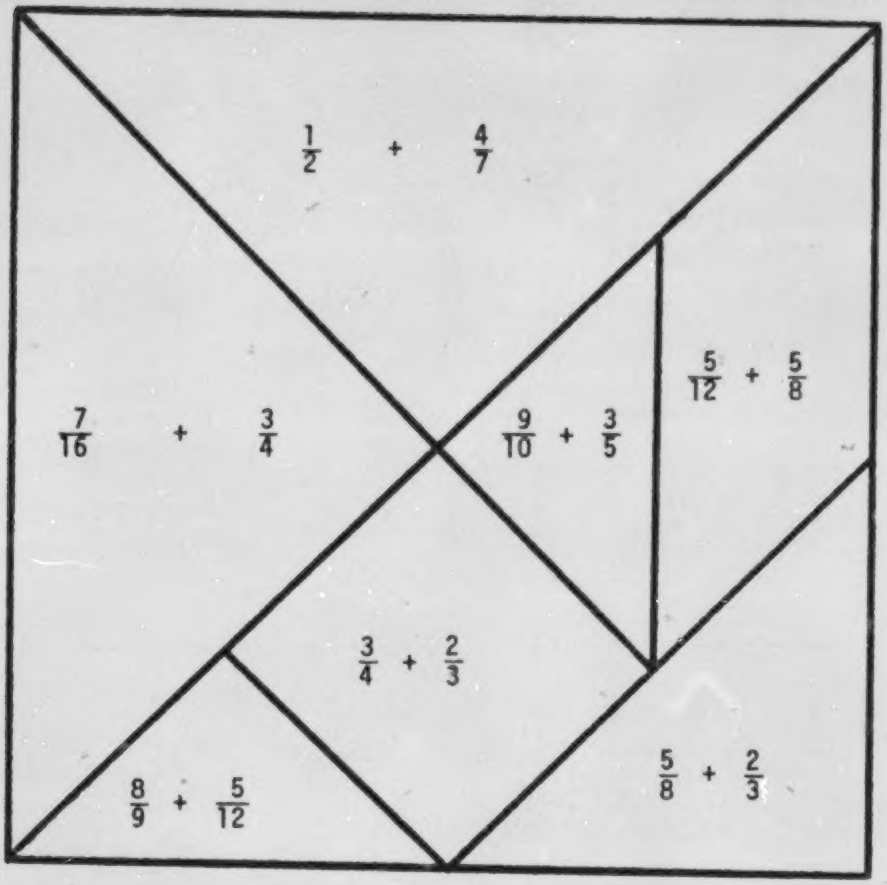
2. 

3. 

4. 

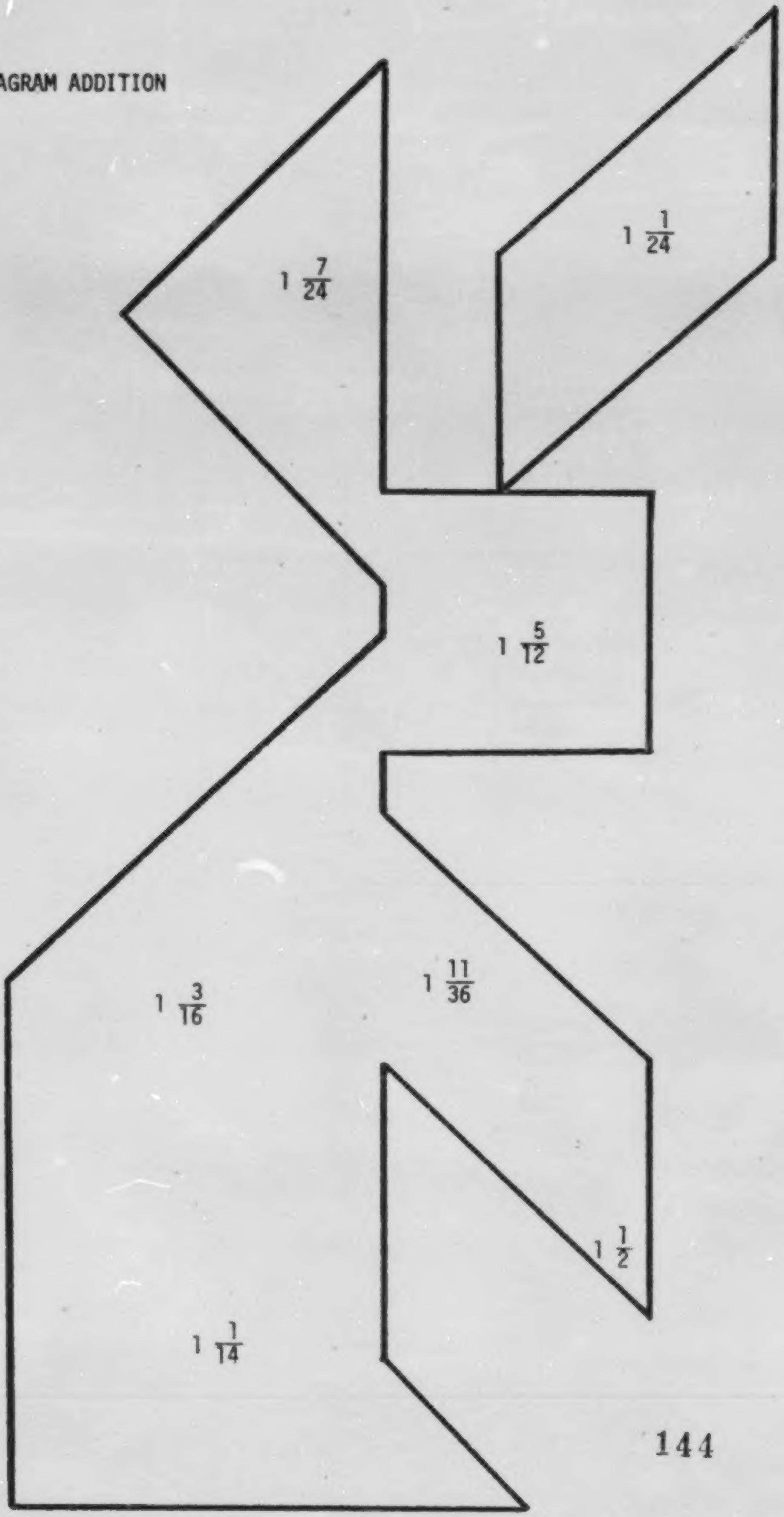
5. 

TANAGRAM ADDITION


$\frac{1}{2} + \frac{4}{7}$
$\frac{7}{16} + \frac{3}{4}$
$\frac{9}{10} + \frac{3}{5}$
$\frac{5}{12} + \frac{5}{8}$
$\frac{3}{4} + \frac{2}{3}$
$\frac{8}{9} + \frac{5}{12}$
$\frac{5}{8} + \frac{2}{3}$

Solve each of the problems on the seven tanagram pieces. The answers give you the clue to solving the picture of the Rabbit. Make dotted lines to show the boundary of each piece where necessary.

TANAGRAM ADDITION


1 1/24
1 7/24
1 5/12
1 11/36
1 3/16
1 1/2
1 1/14

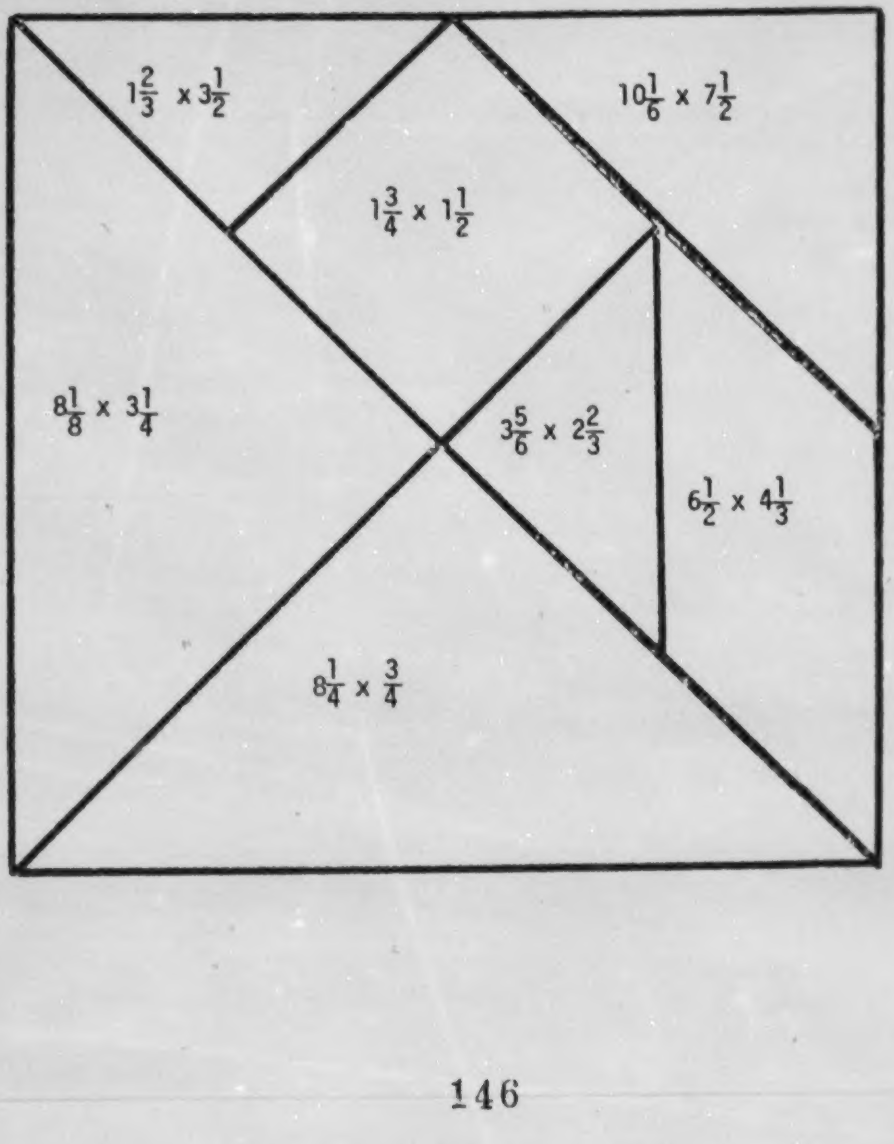
LET'S MAKE A SQUARE

Complete each row and column so that their sums are all the same.

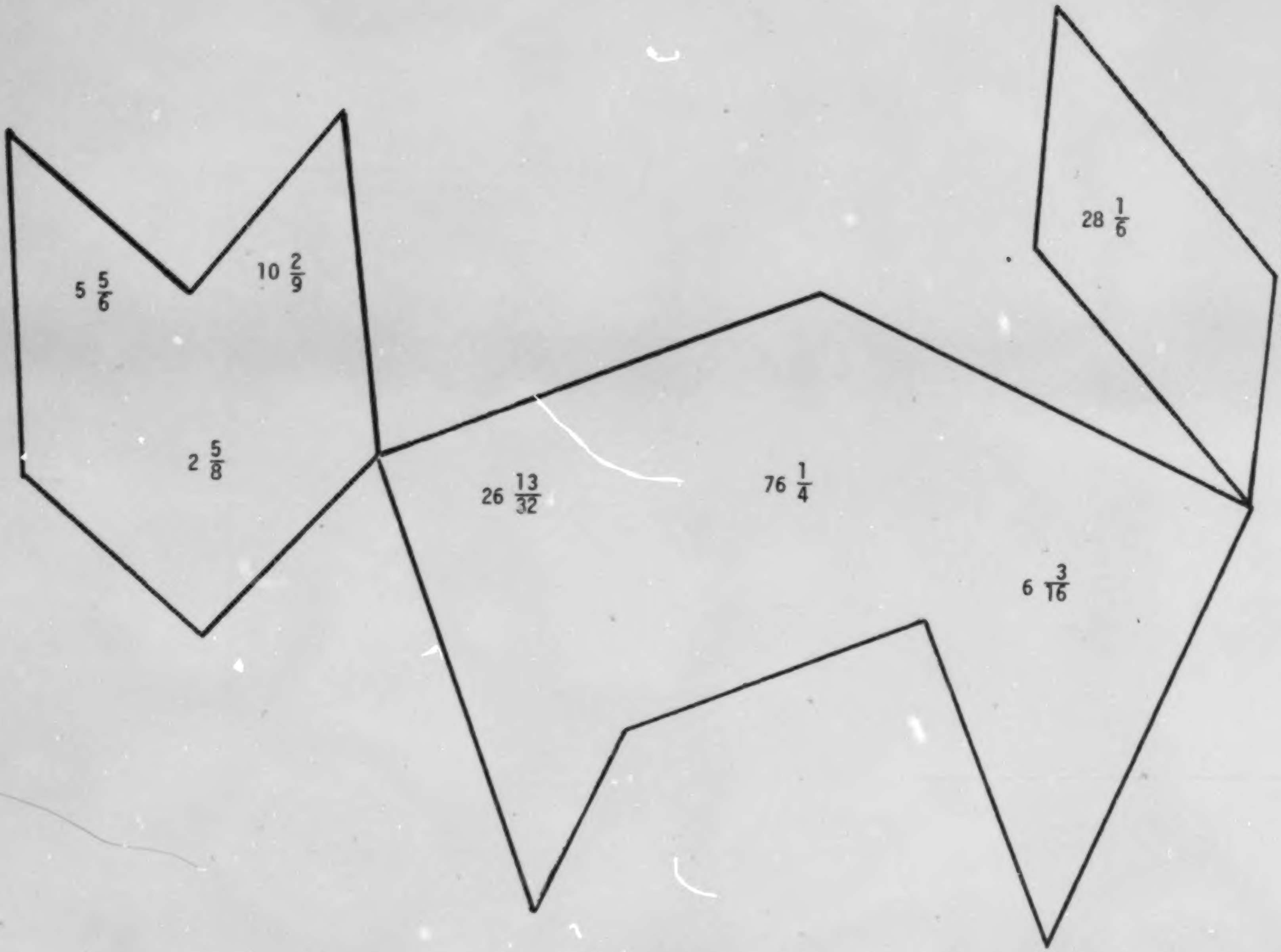
$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{5}$
$\frac{1}{6}$	$\frac{11}{30}$	___
___	___	$\frac{1}{3}$

TANAGRAM MULTIPLICATION

Solve each of the problems on the seven tanagram pieces. The answers give you the clue to solving the picture of the cat. Make dotted lines to show the boundary of each piece where necessary.


$1\frac{2}{3} \times 3\frac{1}{2}$
$10\frac{1}{6} \times 7\frac{1}{2}$
$1\frac{3}{4} \times 1\frac{1}{2}$
$8\frac{1}{8} \times 3\frac{1}{4}$
$3\frac{5}{6} \times 2\frac{2}{3}$
$6\frac{1}{2} \times 4\frac{1}{3}$
$8\frac{1}{4} \times \frac{3}{4}$

TANAGRAM MULTIPLICATION


$28\frac{1}{6}$
$5\frac{5}{6}$
$10\frac{2}{9}$
$2\frac{5}{8}$
$26\frac{13}{32}$
$76\frac{1}{4}$
$6\frac{3}{16}$

FRACTION-GRAM

	○	□	△	⬡
A)	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{8}$
B)	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{4}{9}$	$\frac{2}{7}$
C)	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{3}{8}$	$\frac{1}{12}$
D)	$\frac{5}{8}$	$\frac{7}{10}$	$\frac{9}{14}$	$\frac{5}{16}$

1) □ + ○ , □ + △
2) △ + ⬡ , ○ + ⬡
3) ○ - △ , ○ - □
4) □ - ⬡ , □ - △
5) ⬡ x ○ , ○ x □
6) △ x □ , ⬡ x △
7) ○ ÷ △ , □ ÷ △
8) □ ÷ ⬡ , ⬡ ÷ □
9) ○ x □ ÷ ⬡ , △ ÷ □

- -

A)

B)

C)

D)

A)

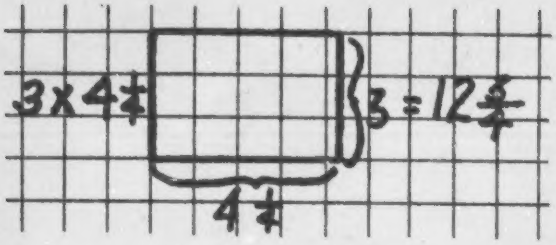
B)

C)

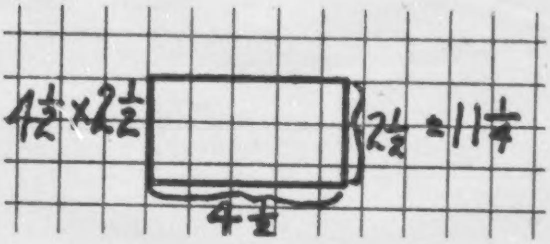
D)

MULTIPLYING MIXED NUMBERS

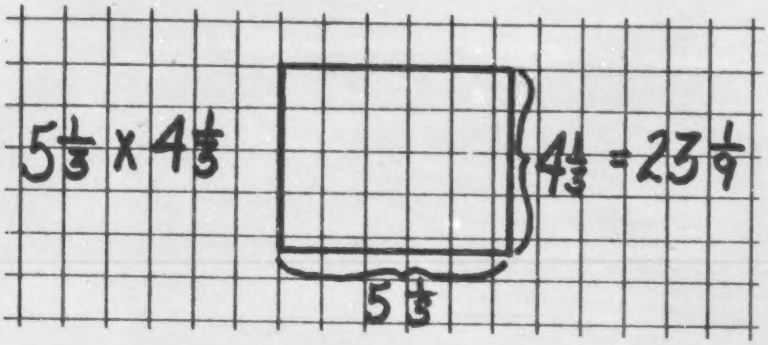
Example 1:


3 x 4¼
3 = 12¾
4¼

Example 2:


4½ x 2½
2½ = 11¼
4½

Example 3:


5⅓ x 4⅓
4⅓ = 23 1/9
5⅓

Use the space below to solve the following problems:

1) 4 x $2\frac{1}{2}$ 2) 6 x $3\frac{3}{4}$ 3) $3\frac{1}{4}$ x $2\frac{1}{2}$ 4) $5\frac{1}{2}$ x $3\frac{1}{3}$

INTO OUTER SPACE WITH "OF"

Operation "of"

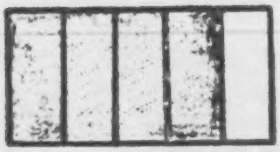
The Star Ship had traveled one-fourth "of" the way from the earth to an earth colony. The earth colony was three-fourths "of" a light-year from earth. Two-thirds "of" the Star Ship's crew had been given special training for this particular mission. This part "of" the Star Ship's crew were called Nuclearians. The Nuclearians were assigned the task of seeking out and destroying hostile aliens who had attacked and kidnapped one-half "of" the earth colony.

The word "of" is often used when working with fractions. Suppose we examine some examples and find out exactly what "of" means in each example. The first two examples are complete. Complete the other five.

To find the answers: Circles, rectangles, line segments, or drawings can be used as models. (A rectangle was used in example 1.)

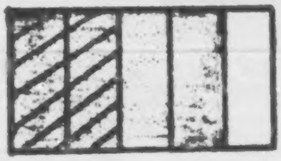
(Example)

Problem	Answer
1) $\frac{1}{2}$ of $\frac{4}{5}$ = △	



(a model of $\frac{4}{5}$)

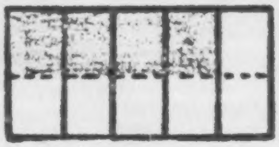
Take $\frac{1}{2}$ "of" $\frac{4}{5}$



$\frac{2}{5}$

or or

(Models of the answer)



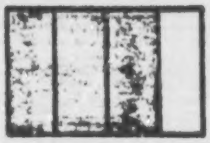
$\frac{4}{10}$

INTO OUTER SPACE WITH "OF"

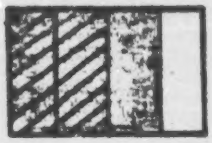
Problem — **Answer**

2) $\frac{2}{3}$ "of" $\frac{3}{4}$

(a model of $\frac{3}{4}$)

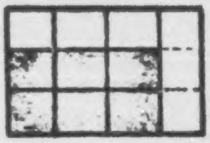


Take $\frac{2}{3}$ "of" $\frac{3}{4}$



or

(Models of the answer)

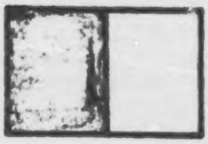


Answer: $\frac{1}{2}$ or $\frac{6}{12}$

Now try:

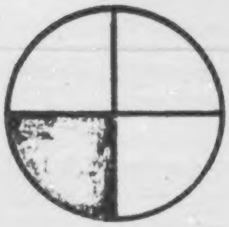
Answer Model

A) $\frac{1}{2}$ of $\frac{1}{2}$



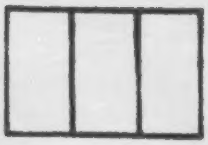
$\frac{\triangle}{\triangle}$

B) $\frac{1}{2}$ of $\frac{1}{4}$



$\frac{\triangle}{\triangle}$

C) $\frac{1}{2}$ of $\frac{1}{3}$

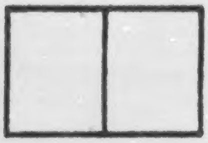


$\frac{\triangle}{\triangle}$

INTO OUTER SPACE WITH "OF"

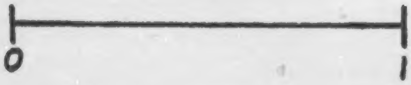
Problem | Answer

D) $\frac{1}{4}$ of $\frac{1}{2}$



$\frac{\triangle}{\triangle}$

E) $\frac{1}{3}$ of $\frac{1}{2}$

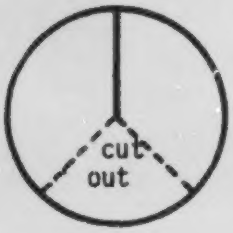


$\frac{\triangle}{\triangle}$

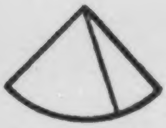
Compare the problems and the answers. Can you discover any method to find the answers without models?

SHOWING MULTIPLICATION WITH CIRCLES

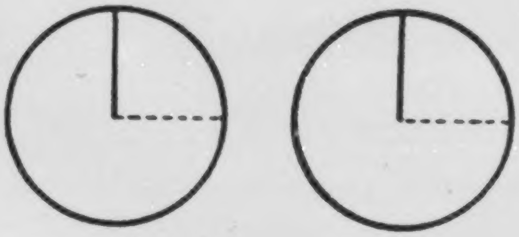
Cut on dotted lines and fold on solid lines.



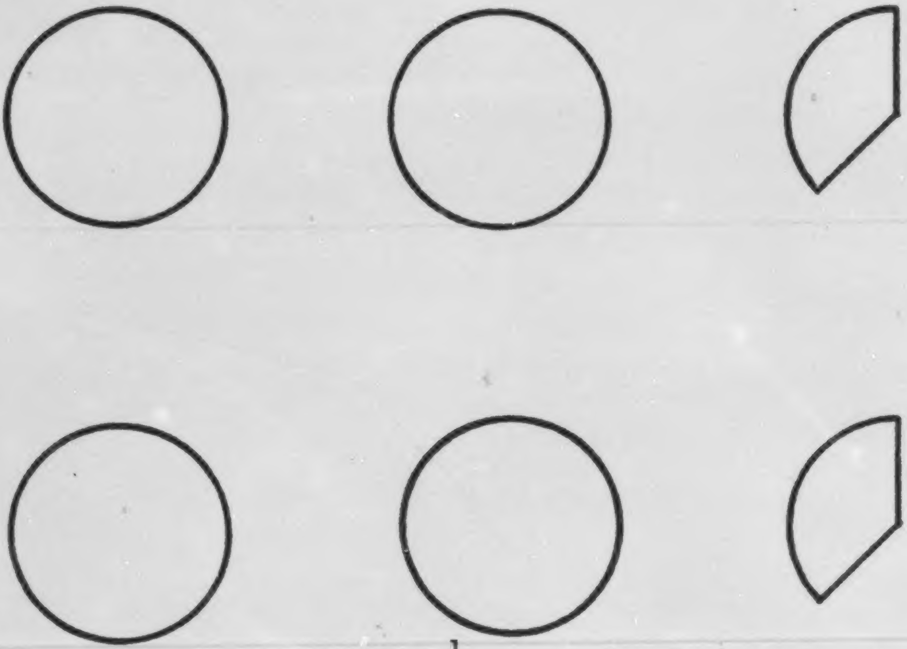
$\frac{1}{2} \times \frac{2}{3}$



$\frac{3}{4} \times \frac{1}{3}$



$\frac{3}{4} \times 2$



$2 \times 2\frac{1}{3}$

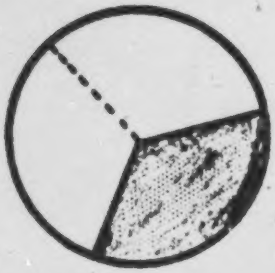
Assign each student the task of finding solutions to several problems. Have them demonstrate their solutions by using circles as above.

SHOWING MULTIPLICATION WITH CIRCLES

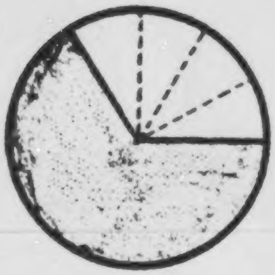
Part I: Directions--

Cut on solid lines and fold on dotted lines. Do not use the shaded portion.

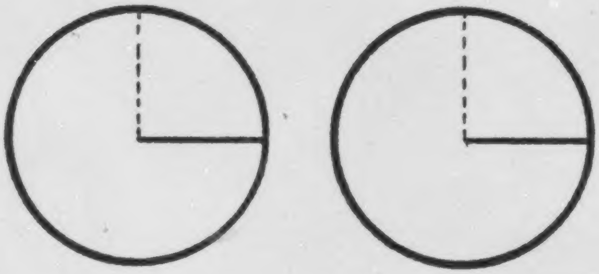
1. $\frac{1}{2} \times \frac{2}{3}$



2. $\frac{3}{4} \times \frac{1}{3}$

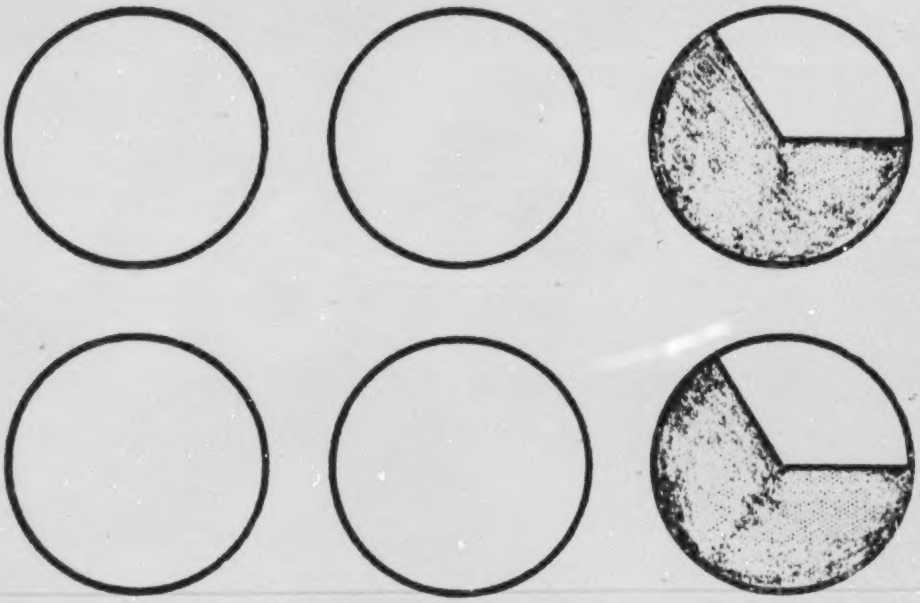


3. $\frac{3}{4} \times 2$



SHOWING MULTIPLICATION WITH CIRCLES

4. $2 \times 2\frac{1}{3}$



Part II: The following problems should be worked by cutting and folding as you did in Part I.

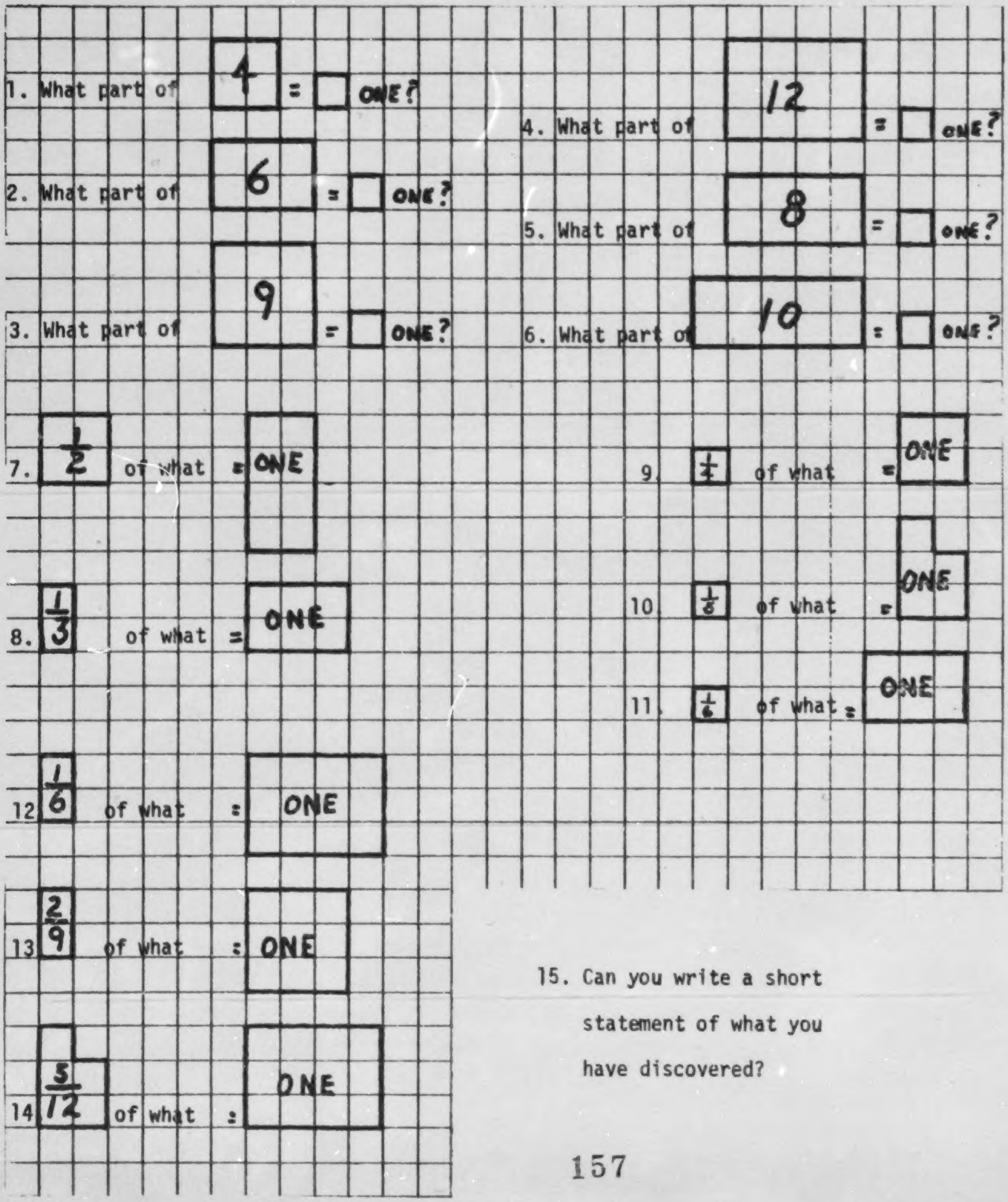
1. $\frac{3}{4} \times \frac{1}{2}$

2. $\frac{3}{5} \times \frac{1}{3}$

3. $\frac{5}{8} \times \frac{5}{6}$

PRODUCT "ONE"

Directions: See what you can discover about each of the following problems.



1. What part of 4 = ☐ ONE?

2. What part of 6 = ☐ ONE?

3. What part of 9 = ☐ ONE?

4. What part of 12 = ☐ ONE?

5. What part of 8 = ☐ ONE?

6. What part of 10 = ☐ ONE?

7. $\frac{1}{2}$ of what = ONE

8. $\frac{1}{3}$ of what = ONE

9. $\frac{1}{4}$ of what = ONE

10. $\frac{1}{8}$ of what = ONE

11. $\frac{1}{6}$ of what = ONE

12. $\frac{1}{6}$ of what = ONE

13. $\frac{2}{9}$ of what = ONE

14. $\frac{5}{12}$ of what = ONE

15. Can you write a short statement of what you have discovered?

NUMBER LINE DIVISION

All division problems involve three numbers--a divisor, a dividend and a quotient

$\frac{12}{6} = 2,$ $12 \div 6 = 2,$ $6\overline{)\,12}^{\,2}$.

1) The divisor is the number by which you divide.

Give the divisor in the example: ______

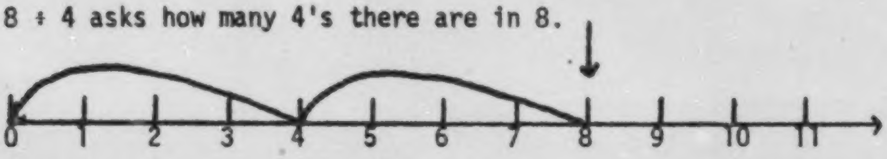
2) The dividend is the number to be divided.

Give the dividend in the example: ______

3) The quotient is the answer.

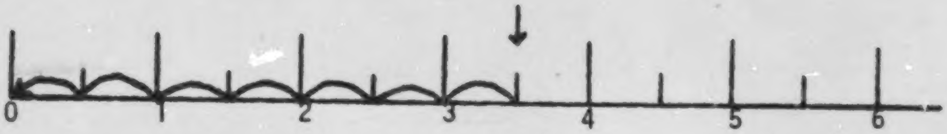
Give the quotient in the example: ______

4) $8 \div 4$ asks how many 4's there are in 8.



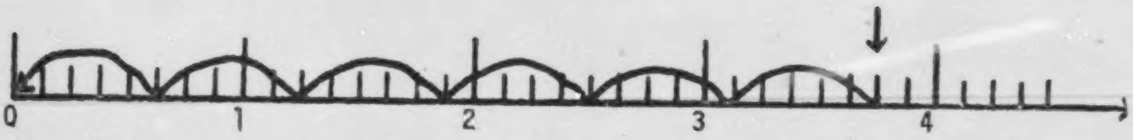
How many 4's are in 8? ______ $8 \div 4 =$ ______

5) $3\frac{1}{2} \div \frac{1}{2}$ asks how many $\frac{1}{2}$'s there are in $3\frac{1}{2}$.



How many $\frac{1}{2}$'s are in $3\frac{1}{2}$? ______ $3\frac{1}{2} \div \frac{1}{2} =$ ______.

6) $3\frac{6}{8} \div \frac{5}{8}$ asks how many $\frac{5}{8}$'s there are in $3\frac{6}{8}$.



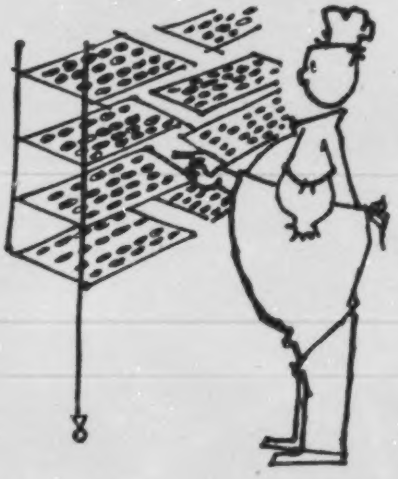
How many $\frac{5}{8}$'s are in $3\frac{6}{8}$? ______ $3\frac{6}{8} \div \frac{5}{8} =$ ______.

COMPLETE THE TABLES

Reduce your answers to lowest terms.

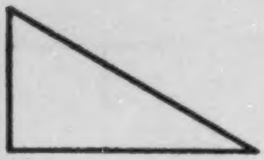
X	$\frac{3}{4}$	$\frac{3}{7}$	$\frac{7}{8}$	$\frac{3}{5}$	$\frac{1}{3}$	$\frac{3}{10}$
$\frac{1}{2}$						
$\frac{2}{5}$						
$\frac{1}{4}$						
$\frac{2}{7}$						
$\frac{5}{8}$						
$\frac{5}{16}$						

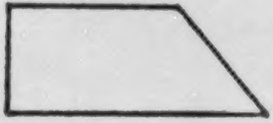
X	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{5}$	$\frac{2}{11}$	$\frac{2}{3}$
$\frac{1}{8}$					
$\frac{2}{5}$					
$\frac{1}{9}$					
$\frac{3}{16}$					
$\frac{1}{12}$					

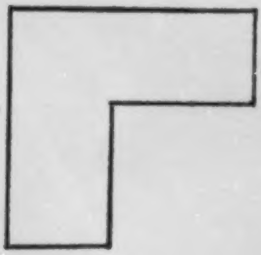


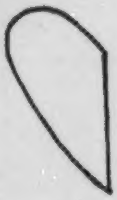
MAKE THEM WELL AGAIN

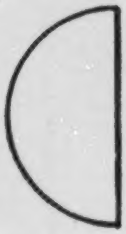
Part I: Find the following--Each of the following is one half of a figure. Continue the drawing so that it becomes a complete figure.











Part II: Answer these questions: What do you ÷ by to find?

1) $\frac{1}{2}$ of anything? ________________

2) $\frac{1}{4}$ of anything? ________________

3) $\frac{1}{8}$ of anything? ________________

4) $\frac{1}{16}$ of anything? ________________

Part III: Find the answer:

1) $\frac{1}{4}$ of 28 = ________________

2) $\frac{1}{8}$ of 64 = ________________

3) $\frac{1}{8}$ of one pound = ____________

4) $\frac{1}{8}$ of one foot = ____________

5) $\frac{1}{8}$ of 96 = ______________

6) $\frac{1}{16}$ of 48 = ________________

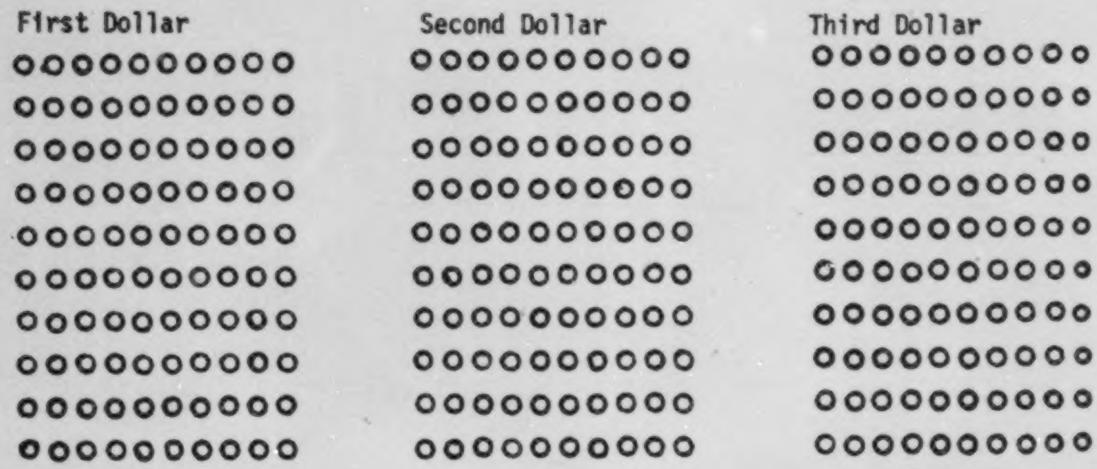
7) $\frac{1}{8}$ of one mile = ______________

8) $\frac{1}{8}$ of one gallon = ______________

9) $\frac{1}{8}$ of one ton = ______________

10) $\frac{1}{8}$ of 24 = ____________

MONEY FRACTIONS



Use these pennies to help you answer the questions below.

1. $\frac{1}{2}$ of a dollar is $\frac{\quad}{100}$ or cents or $ .50

2. $\frac{3}{2}$ of a dollar is $\frac{\quad}{100}$ or cents or

3. $\frac{1}{4}$ of \$1 = $\frac{\quad}{100}$ or cents or

4. $\frac{3}{4}$ of \$1 = $\frac{\quad}{100}$ or cents or

5. $\frac{5}{4}$ of \$1 = $\frac{\quad}{100}$ or cents or

6. $\frac{6}{4}$ of \$1 = $\frac{\quad}{100}$ or cents or

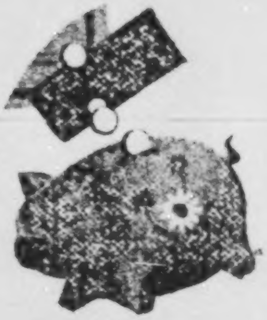
7. $\frac{9}{4}$ of \$1 = $\frac{\quad}{100}$ or cents or

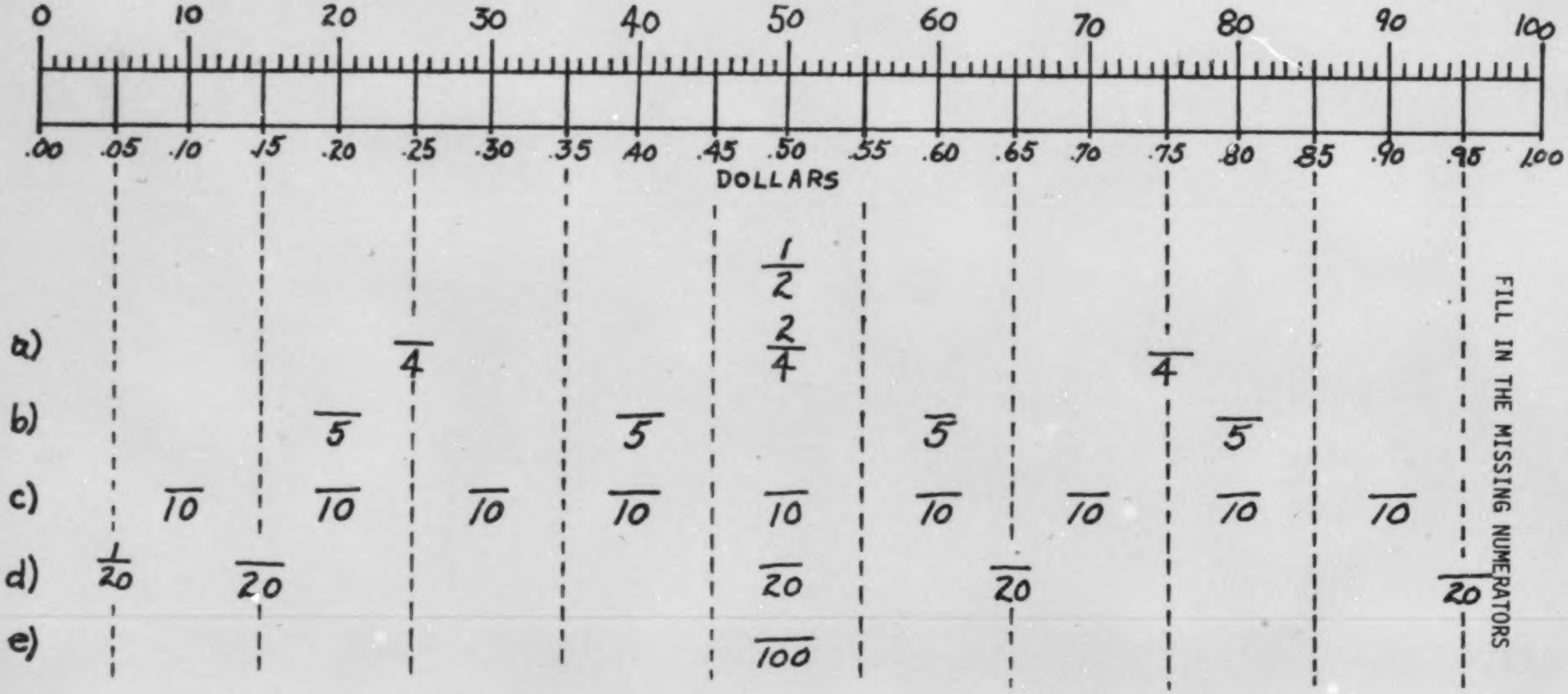
8. $\frac{1}{10}$ of \$1 = $\frac{\quad}{100}$ or cents or

9. $\frac{9}{10}$ of \$1 = $\frac{\quad}{100}$ or cents or

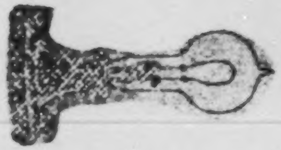
10. $\frac{15}{10}$ of \$1 = $\frac{\quad}{100}$ or cents or

11. $\frac{23}{10}$ of \$1 = $\frac{\quad}{100}$ or cents or




0 10 20 30 40 50 60 70 80 90 100
.00 .05 .10 .15 .20 .25 .30 .35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .85 .90 .95 1.00
DOLLARS
1/2
a) 4 2/4 4
b) 5 5 5 5
c) 10 10 10 10 10 10 10 10 10
d) 1/20 20 20 20 20
e) 100

FILL IN THE MISSING NUMERATORS



FOLDING UNITS TO MAKE PARTS

Directions:

1. Fold one strip of paper into 2 equal parts. Make a line on the fold and shade one of the equal parts.

2. Fold the next strip into 4 equal parts. Make a line on each fold and shade 3 of the parts.

3. Fold another strip into 8 equal parts. Make a line on each fold and shade 5 of the parts.

4. Can you fold one of your other strips into:
   - a) 3 equal parts?
   - b) 6 equal parts?
   - c) 5 equal parts?

   Shade some of the equal parts for each of a, b, and c.
   What tool could you use to make the job of folding easier?

$$\frac{\text{shaded part}}{\text{total parts}} = \frac{\text{numerator}}{\text{denominator}}$$

The terms of a fraction are expressed by writing the number of parts "interested in" (the shaded parts in this case) over the total parts of the unit. Numerator is the term for "interested in" and denominator is the term for total parts of the unit.

5. Can you now write a fraction showing the numerator and denominator for each of these problems that you worked with in the above problems?

(1) $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

(2) $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

(3) $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

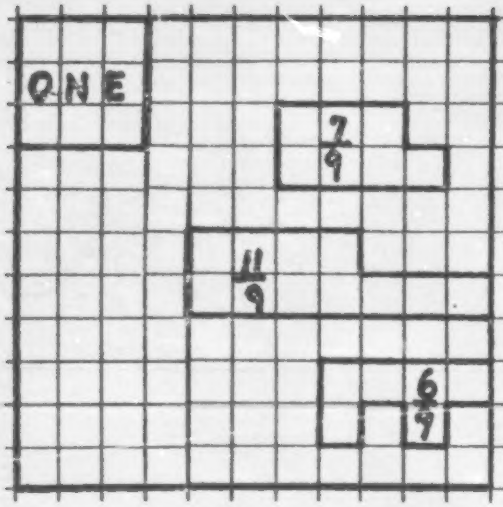
(4) a. $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

b. $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

c. $\frac{\text{Numerator}}{\text{Denominator}}$ = ____________________

FINDING PARTS OF A UNIT

Example:


ONE
7/9
11/9
6/9

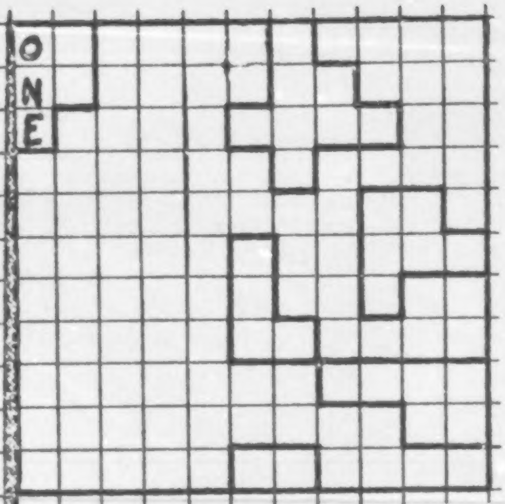
DIRECTIONS:

In each of these problems you are shown one unit.

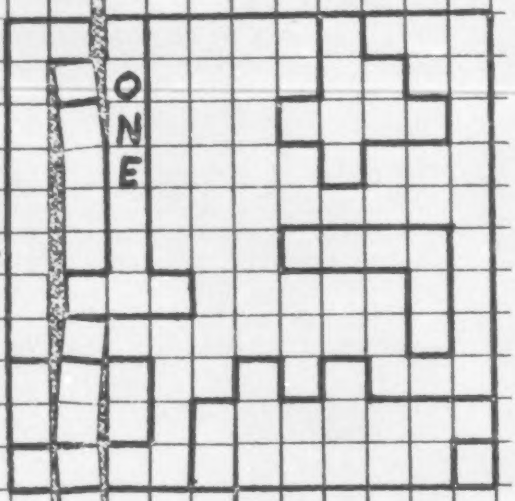
You are also shown some figures that are to be compared to the unit.

Write a comparison of the figure to the unit as shown by the example.

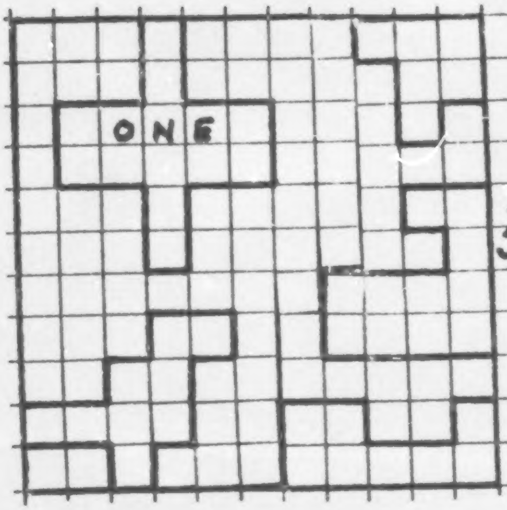
1.



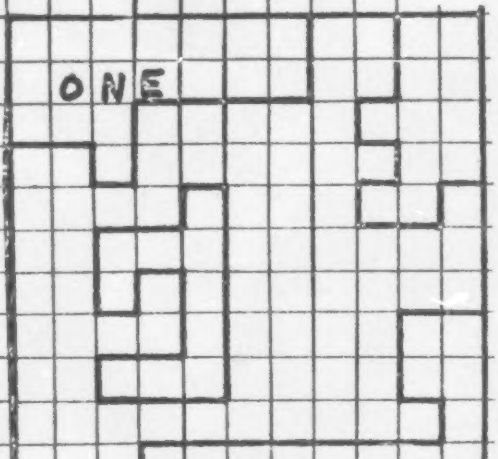
2.



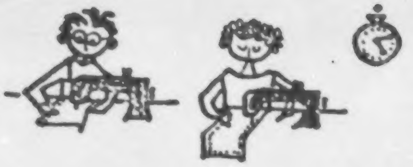
3.



4.



FINDING PARTS OF A UNIT



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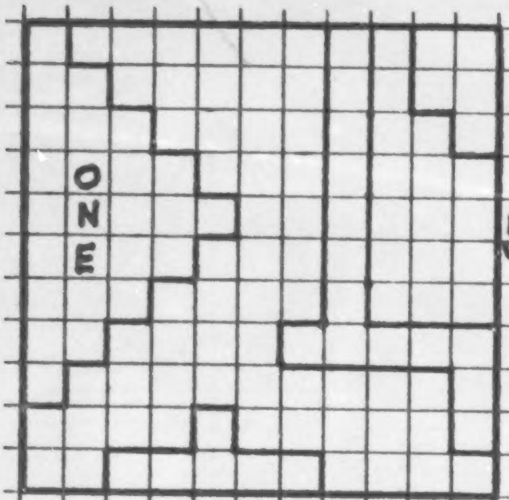
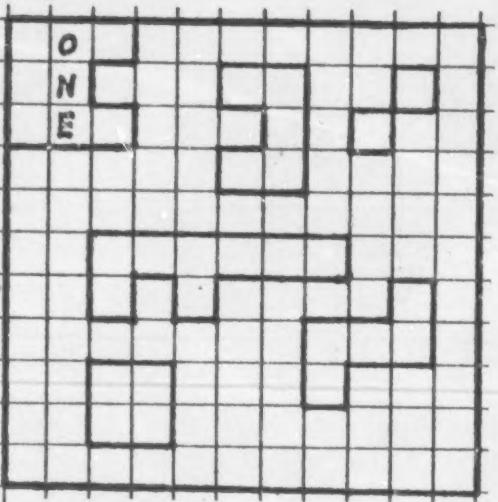


6.



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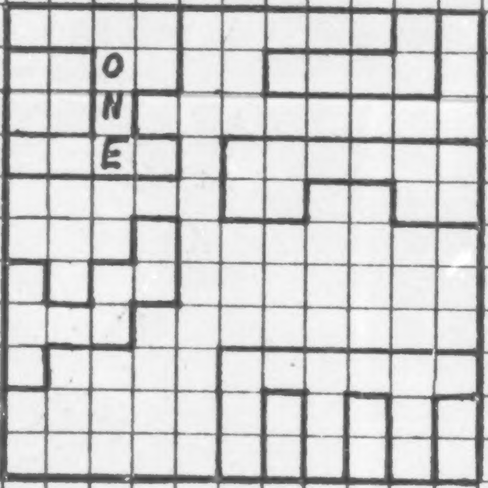
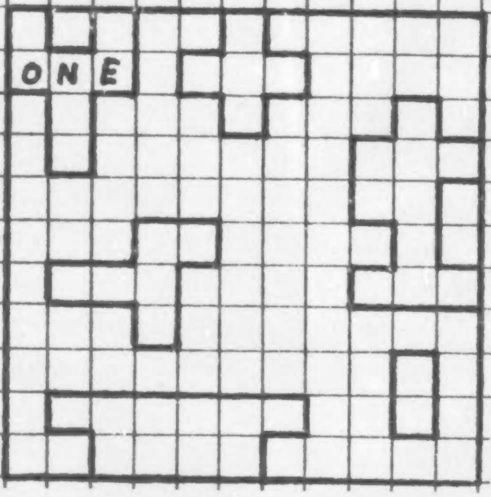
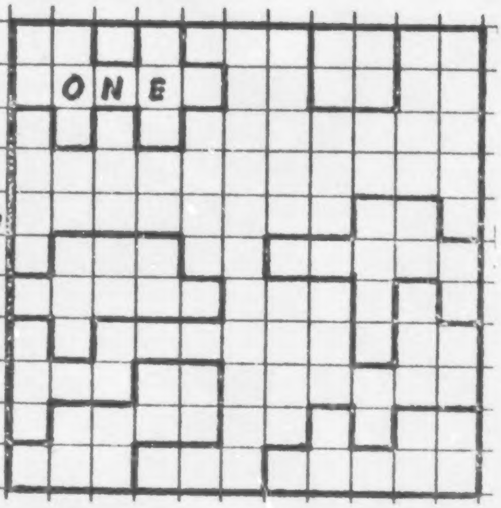


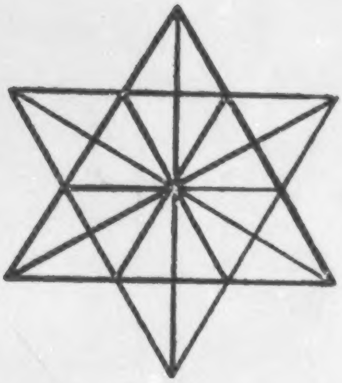
8.



9.

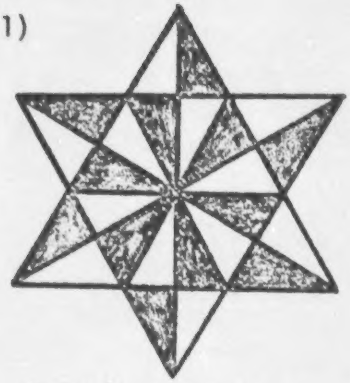


STAR PARTS



REFERENCE FIGURE

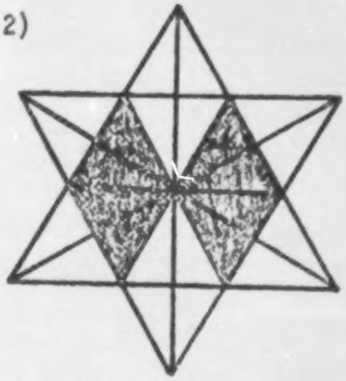
1)



Fraction Shaded ________

Fraction Not Shaded _____

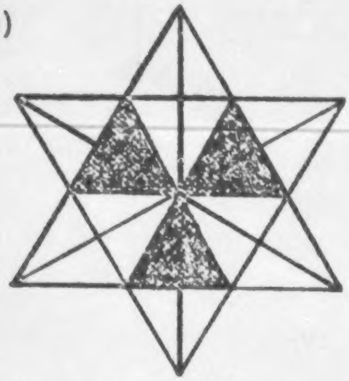
2)



Fraction Shaded ________

Fraction Not Shaded _____

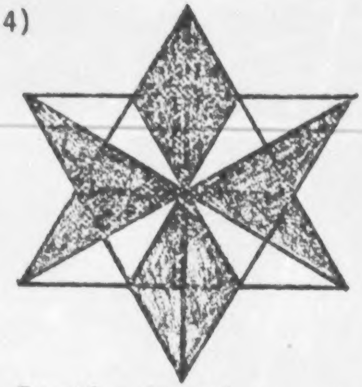
3)



Fraction Shaded ________

Fraction Not Shaded _____

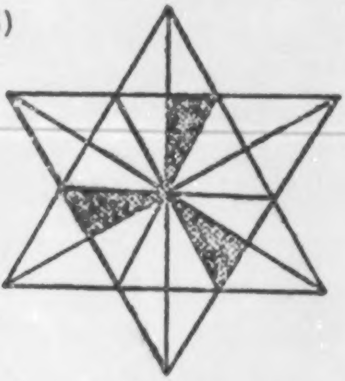
4)



Fraction Shaded ________

Fraction Not Shaded _____

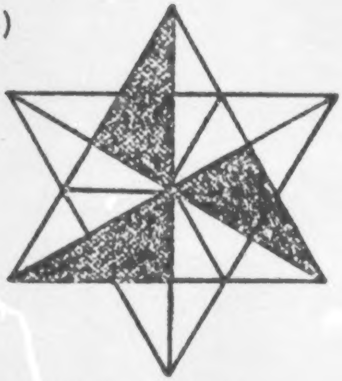
5)



Fraction Shaded ________

Fraction Not Shaded _____

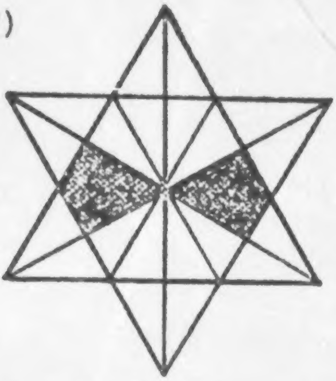
6)



Fraction Shaded ________

Fraction Not Shaded _____

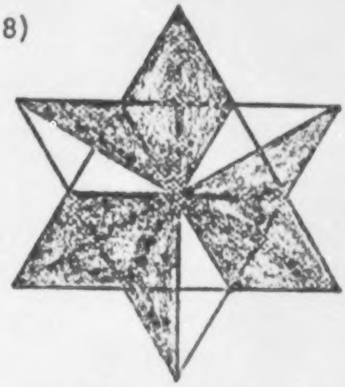
7)



Fraction Shaded ________

Fraction Not Shaded _____

8)

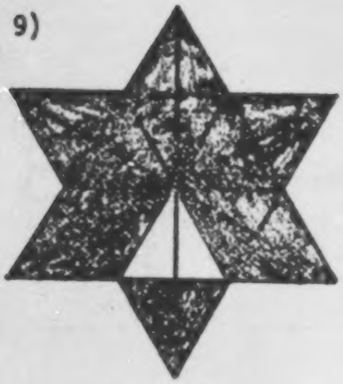


Fraction Shaded ________

Fraction Not Shaded _____

STAR PARTS

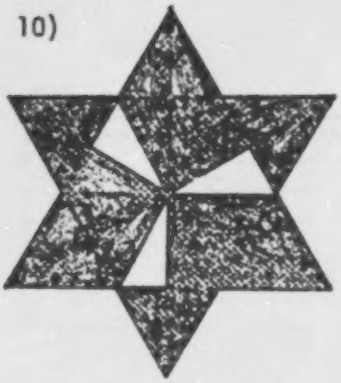
9)



Fraction Shaded ________

Fraction Not Shaded _____

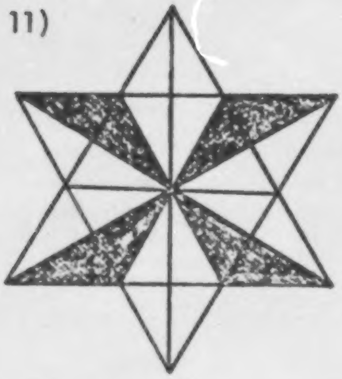
10)



Fraction Shaded ________

Fraction Not Shaded _____

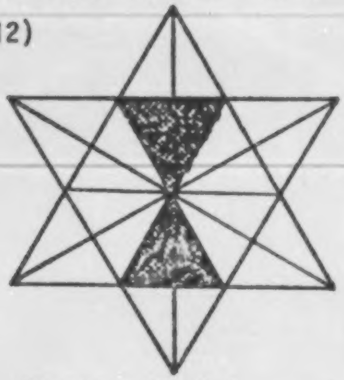
11)



Fraction Shaded _______

Fraction Not Shaded ___

12)



Fraction Shaded ________

Fraction Not Shaded _____

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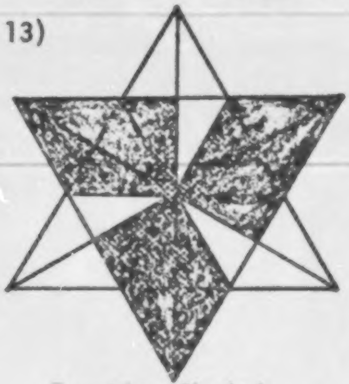

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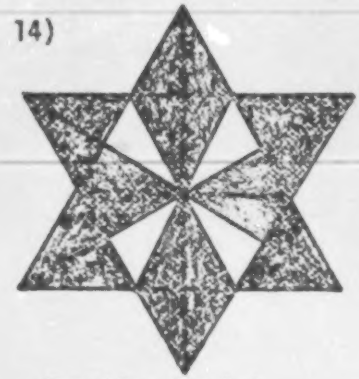
Fraction Not Shaded _____

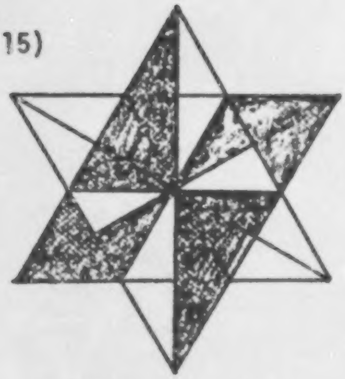
14)



Fraction Shaded _______

Fraction Not Shaded ___

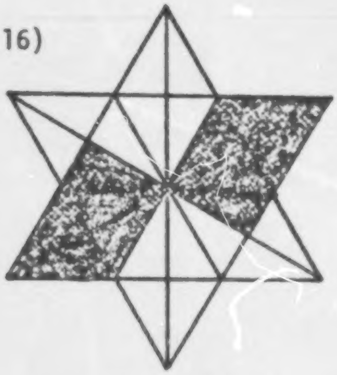
15)



Fraction Shaded ________

Fraction Not Shaded _____

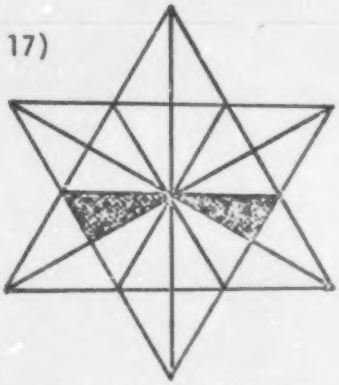
16)



Fraction Shaded ________

Fraction Not Shaded _____

17)

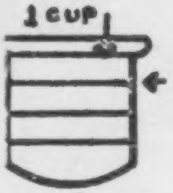


Fraction Shaded _______

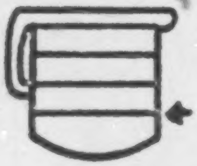
Fraction Not Shaded ___

YOU NAME IT

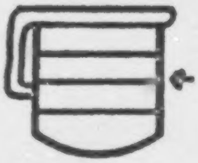
Tell what fractional part of a cup is indicated at the arrow on each figure below. (A is completed for you as an example.)



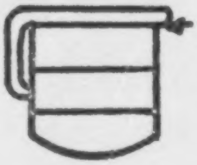
A $\frac{3}{4}$



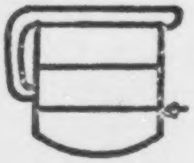
B ____



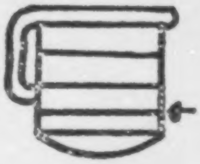
C ____



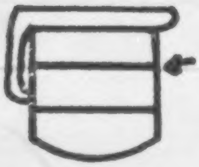
D ____



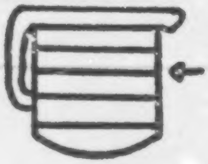
E ____



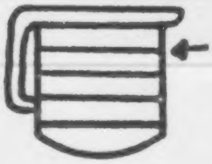
F ____



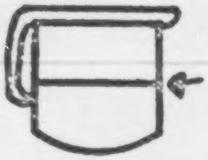
G ____



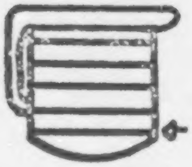
H ____



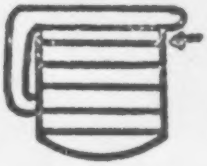
I ____



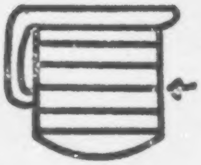
J ____



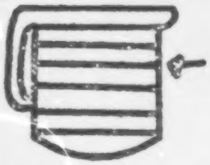
K ____



L ____



M ____



N ____

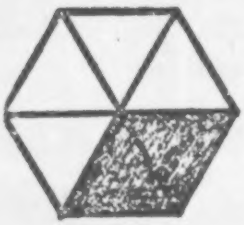
What fraction does the shaded part of each of the following pictures suggest?

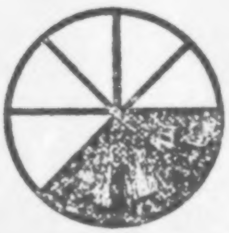
1) ____________

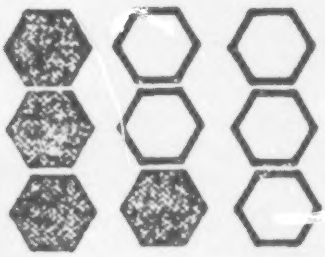
2) ____________

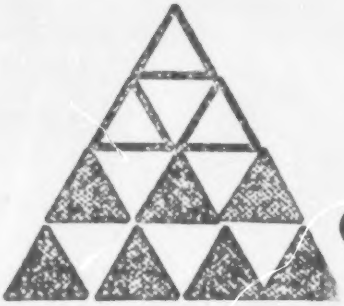
3) ____________

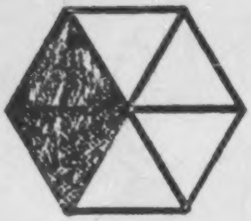
4) ____________



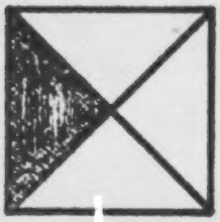




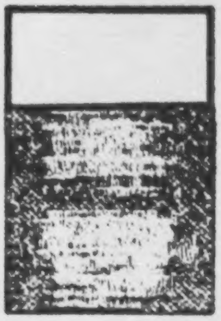




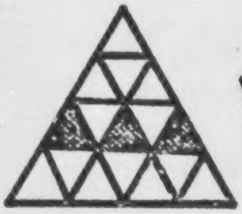
5) __________



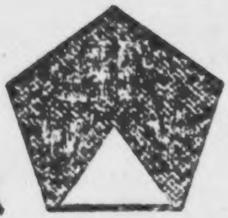
6) __________



7) __________



8) __________



9) __________

10) Write the fraction that shows the part of the homework Nancy finished.

____

11) How many of the problems that she worked did Nancy miss?

____

12) What fraction of the problems that Nancy worked were correct?

____

13) Correct Nancy's mistakes.

Nancy's Homework

NANCY
(Name)

1. 32
x3
96

2. 57
x4
228

3. 19
x2
28

4. 82
x5
410

5. 123
x 4
492

6. 64
x7
438

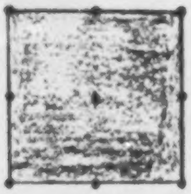
7. 26
x8
204

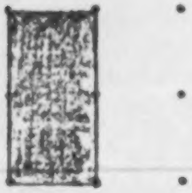
8. 93
x6

FENCED IN

Here is one unit of area. Fill in the fraction of part shaded after each figure.

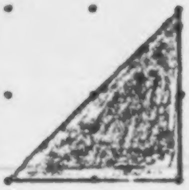
Indicate part shaded by each arrow.





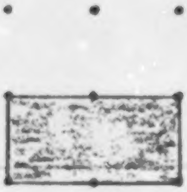
→ $\frac{1}{2}$

1)



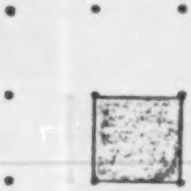
→ $\frac{\_}{2}$

2)



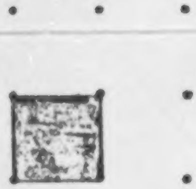
→ _

3)



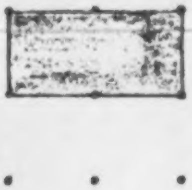
→ _

)



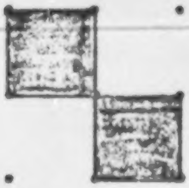
→ _

5)



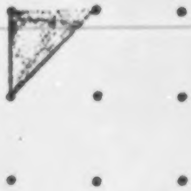
→ _

6)



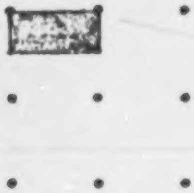
→ _

7)



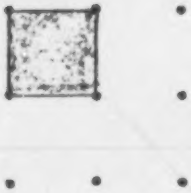
→ _

)



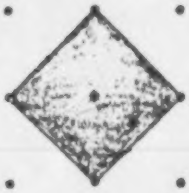
→ _

9)



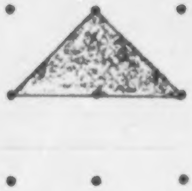
→ _

10)



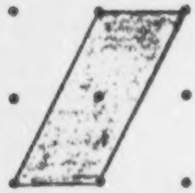
→ _

11)



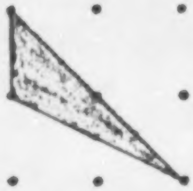
→ _

)



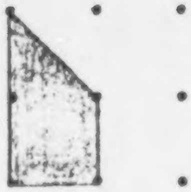
→ _

13)



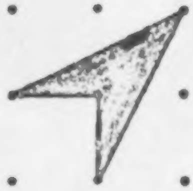
→ _

14)



→ _

15)



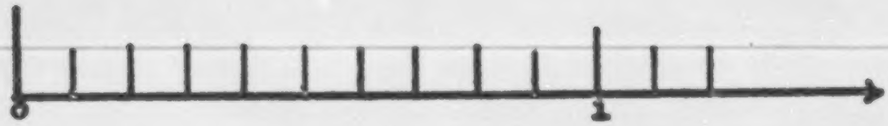
→ _

FRACTION LINE-UP

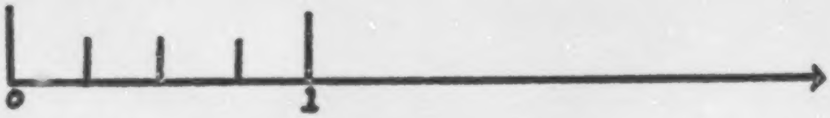
I. Locate and mark the following fractions: (on the number line below)

1. $\frac{7}{10}$ and $\frac{3}{10}$ on line A.
2. $\frac{3}{4}$ and $\frac{1}{4}$ on line B.
3. $\frac{1}{4}$ and $\frac{3}{4}$ on line C.
4. $\frac{5}{8}$ and $\frac{7}{8}$ on line D.
5. $\frac{0}{6}$ and $\frac{4}{6}$ on line E.
6. $\frac{4}{5}$ and $\frac{2}{5}$ on line F.

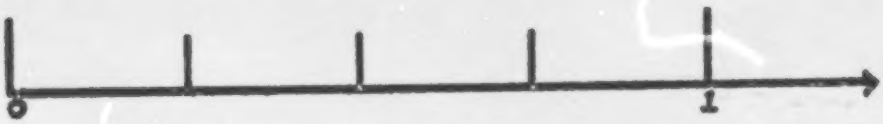
A



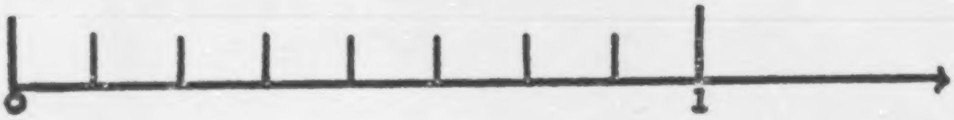
B



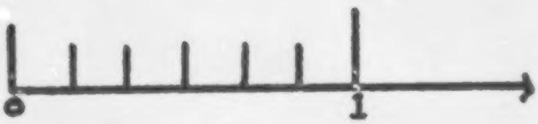
C



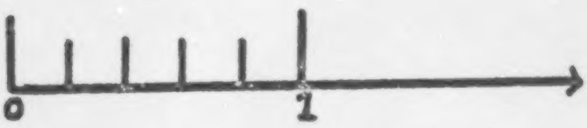
D



E

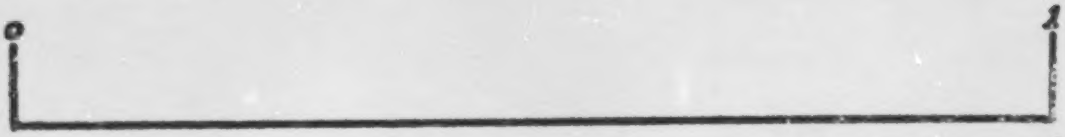


F

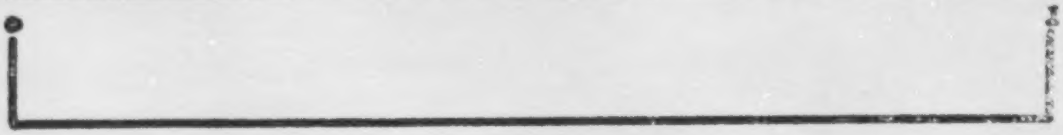


II. The fraction at the left of each number line tells you what points to locate on the number line. For example, in exercise 10, use your ruler to locate $\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, and $\frac{5}{6}$.

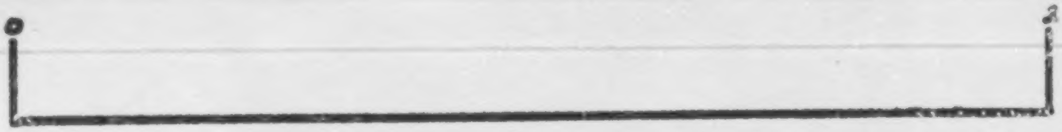
7. $\frac{1}{2}$'s



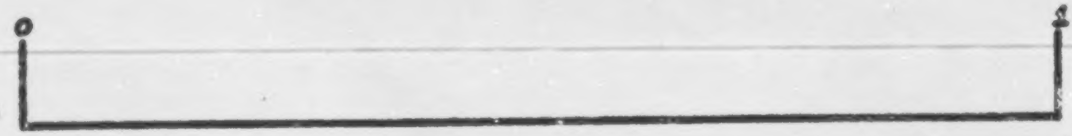
8. $\frac{1}{3}$'s



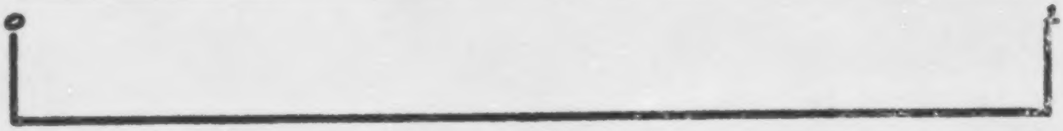
9. $\frac{1}{4}$'s



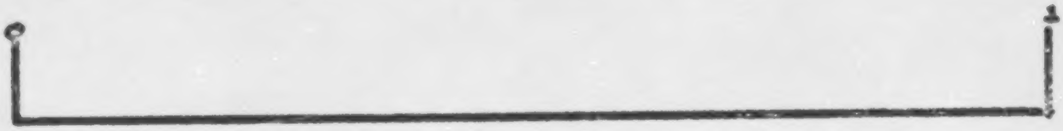
10. $\frac{1}{6}$'s



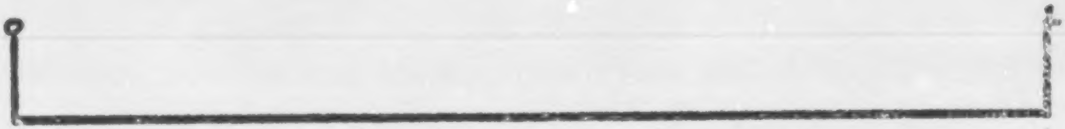
11. $\frac{1}{8}$'s

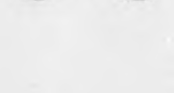


12. $\frac{1}{12}$'s



13. $\frac{1}{16}$'s



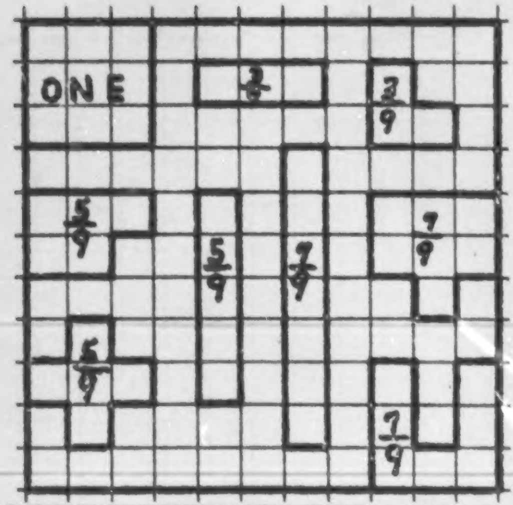


FENCE ME IN

Example: a. $\frac{3}{9}$

b. $\frac{5}{9}$

c. $\frac{7}{9}$



DIRECTIONS:

Draw one or more examples of each of the suggested fractions in problems 1 - 9.

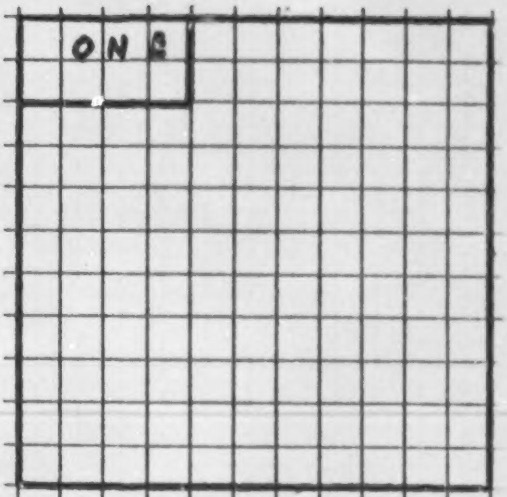
You are shown in the example that there is more than one possibility for each fraction.

1.

a. $\frac{3}{8}$

b. $\frac{5}{8}$

c. $\frac{4}{8}$

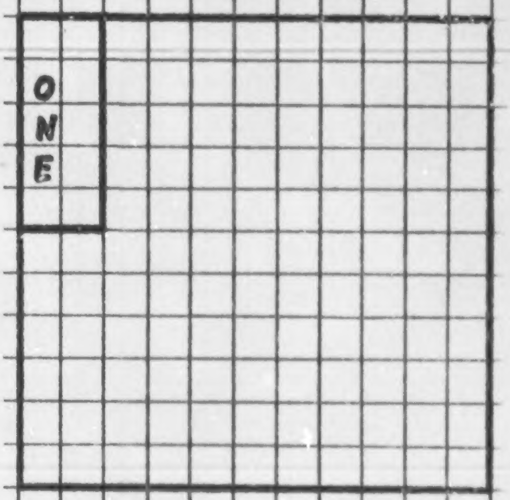


2.

a. $\frac{4}{10}$

b. $\frac{7}{10}$

c. $\frac{9}{10}$

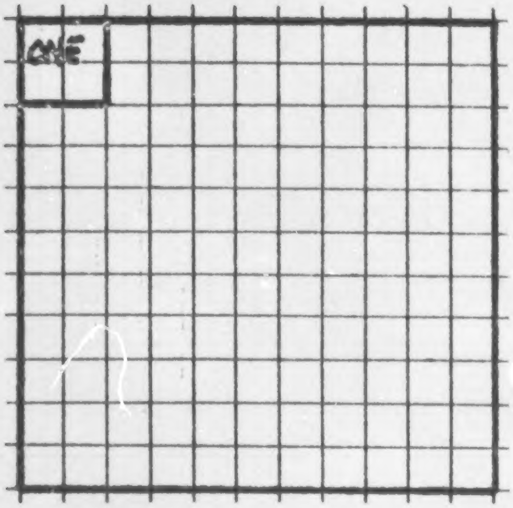


3.

a. $\frac{3}{4}$

b. $\frac{1}{4}$

c. $\frac{7}{4}$

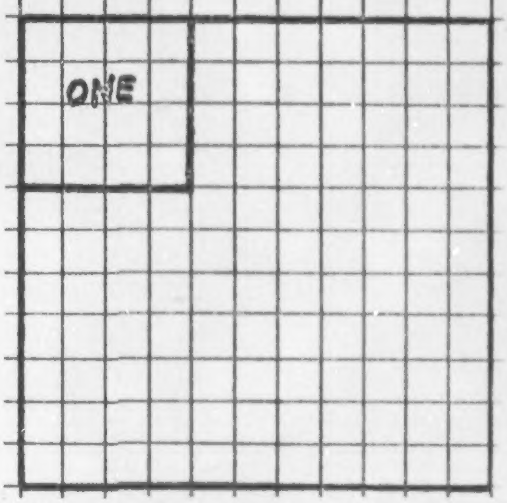


4.

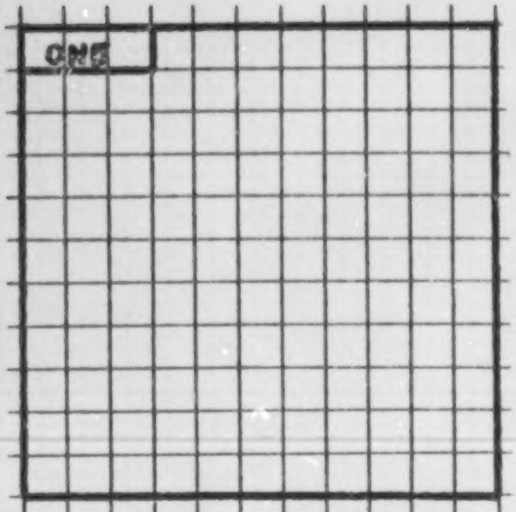
a. $\frac{7}{16}$

b. $\frac{11}{16}$

c. $\frac{17}{16}$



FENCE ME IN



5.

a. $\frac{2}{3}$

b. $\frac{4}{3}$

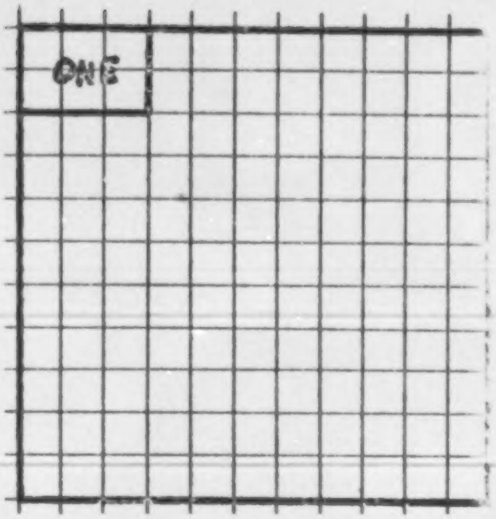
c. $\frac{8}{3}$

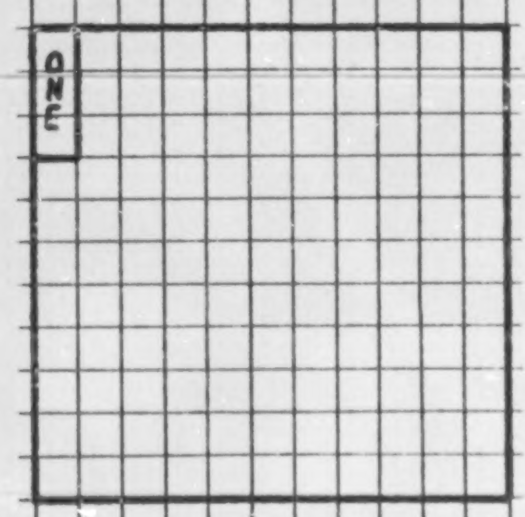
6.

a. $\frac{5}{6}$

b. $\frac{3}{6}$

c. $\frac{11}{6}$





7.

a. $\frac{1}{2}$

b. $\frac{5}{2}$

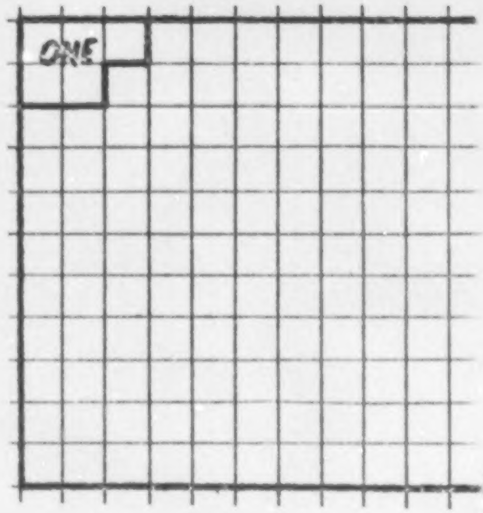
c. $\frac{8}{2}$

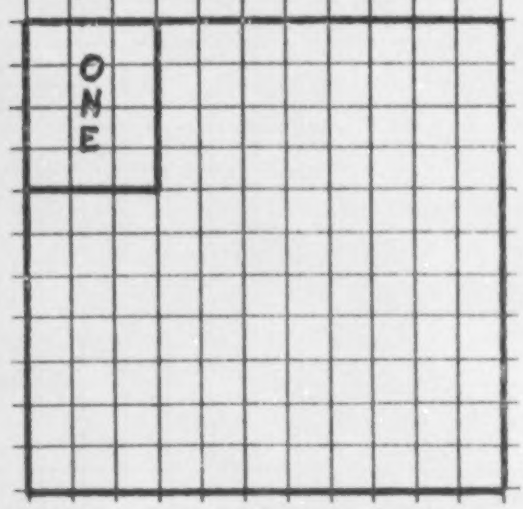
9.

a. $\frac{2}{5}$

b. $\frac{4}{5}$

c. $\frac{9}{5}$





8.

a. $\frac{5}{12}$

b. $\frac{7}{12}$

c. $\frac{15}{12}$

WHAT DOES IT TAKE TO MAKE ONE?

Directions:

You will receive an envelope which contains eight different pieces with different letters. The only one that is labeled is the "one unit." You are to find out how many of each of the others it will take to make our "unit one."

1. It will take ____________________ A's to make our unit one.

2. It will take ____________________ D's to make our unit one.

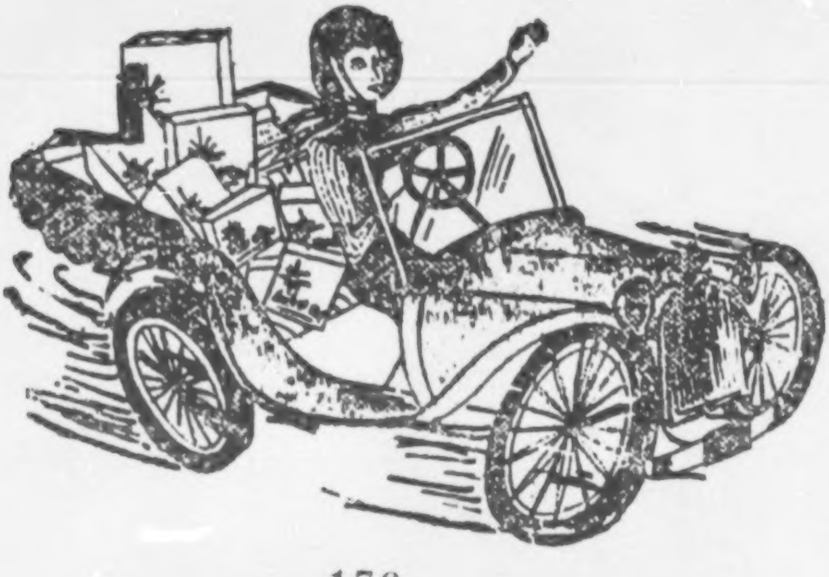
3. It will take ____________________ F's to make our unit one.

4. It will take ____________________ B's to make our unit one.

5. It will take ____________________ E's to make our unit one.

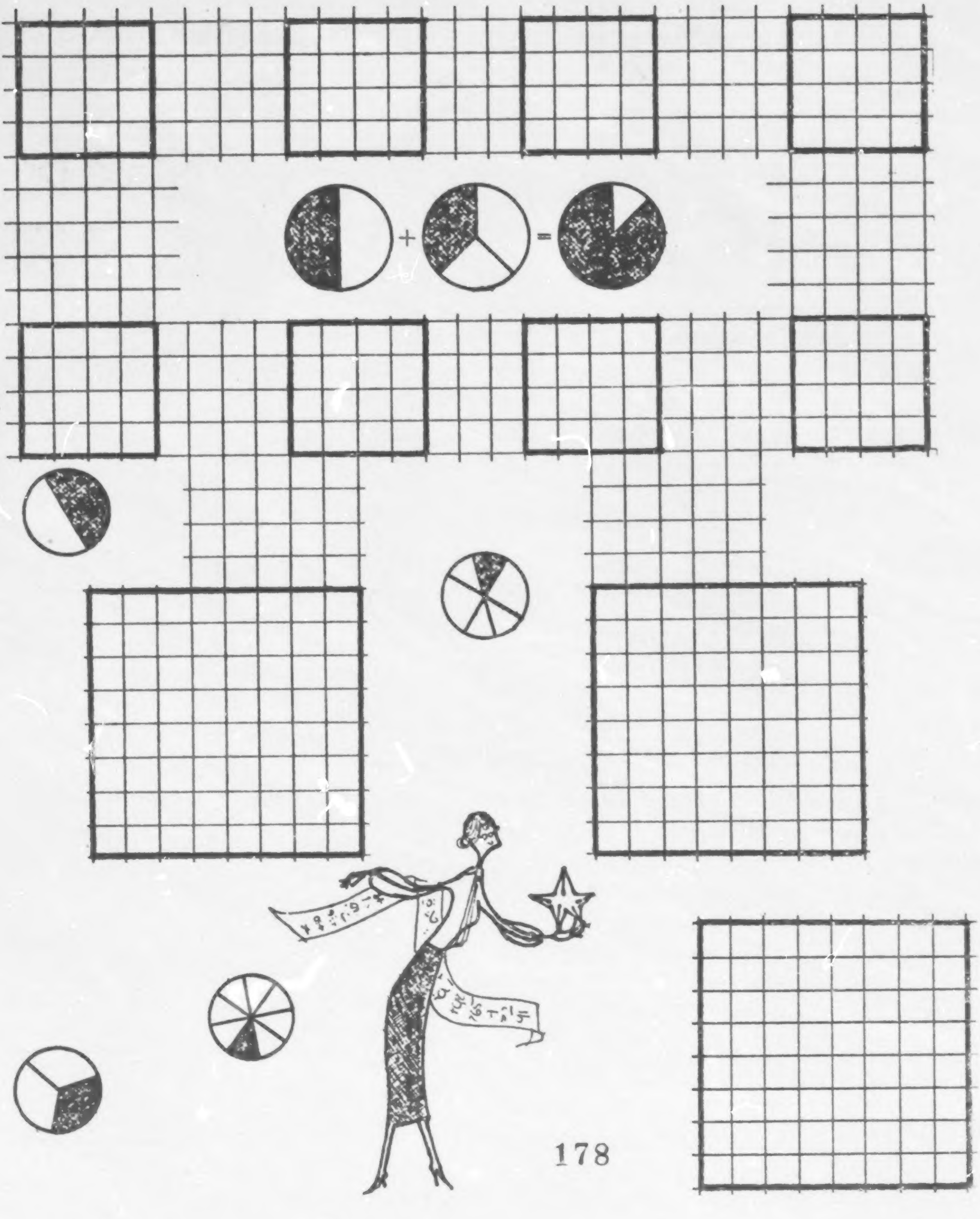
6. It will take ____________________ G's to make our unit one.

7. It will take ____________________ C's to make our unit one.



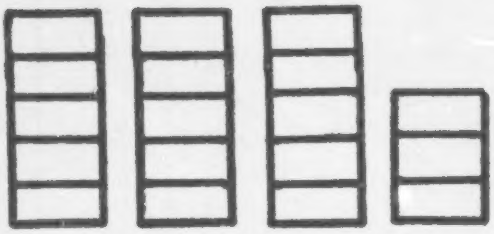
REDUCE IT

FRACTION FUN

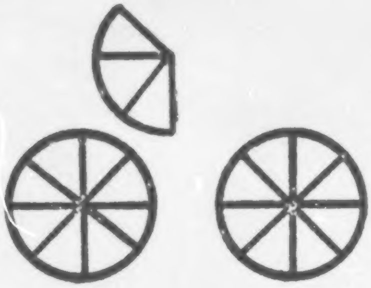


LET'S WRITE IMPROPER FRACTIONS AND MIXED NUMBERS

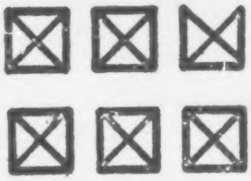
Write the mixed number and improper fraction that each picture suggests:



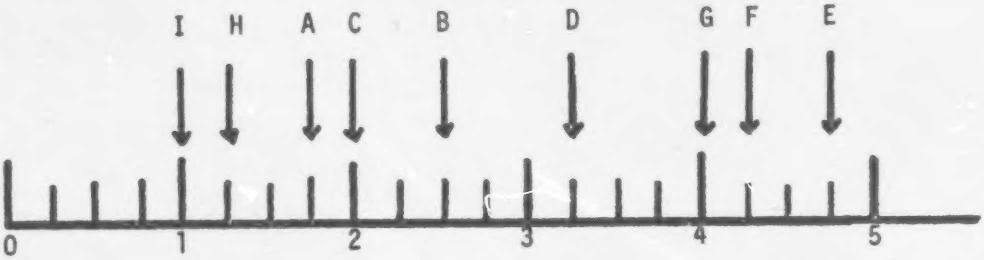
1. ________ = ________



2. ________ = ________



3. ________ = ________



$\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ $\frac{4}{4}$ $\frac{5}{4}$

4. Point A could be located by thinking 1 + _____ = ________

This is called a mixed number. A mixed number is the sum of a natural number (counting numbers and zero) and a fraction.

5. Give another name for point A. ______________

6. Find two names for:

B ______________ ______________

C ______________ ______________

D ______________ ______________

E ______________ ______________

F ______________ ______________

G ______________ ______________

H ______________ ______________

I ______________ ______________

WE MAKE IMPROPER AND MIXED FRACTIONS

Directions: 1) The red bar is called our "one unit." Write as both an improper fraction and a mixed number--all the colors larger than the red bar.

	IMPROPER FRACTION	MIXED NUMBER
1. light green		
2. purple		
3. yellow		
4. dark green		
5. black		
6. brown		
7. blue		
8. orange		

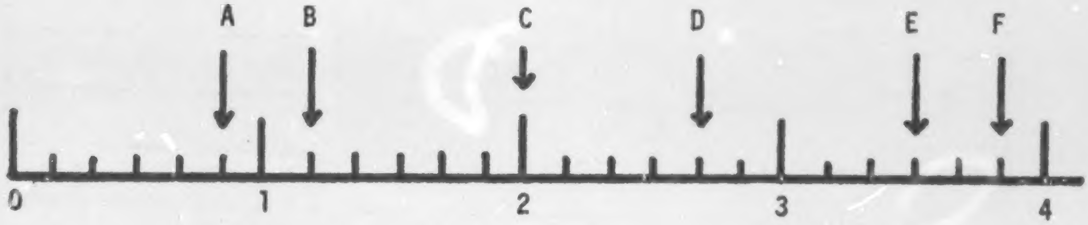
2) If our light green bar is called our "one unit," write the following both as improper fractions and mixed numbers.

	IMPROPER FRACTION	MIXED NUMBER
1. purple		
2. yellow		
3. dark green		
4. black		
5. brown		
6. blue		
7. orange		

3) If our purple bar is our "one unit," write each of the following as both an improper fraction and a mixed number.

	IMPROPER FRACTION	MIXED NUMBER
1. yellow		
2. dark green		
3. black		
4. brown		
5. blue		
6. orange		

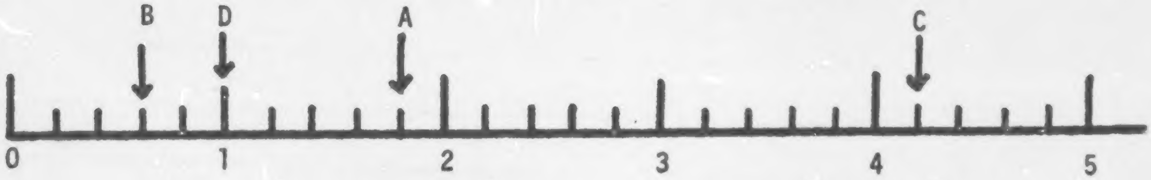
MAKING FRACTIONS FROM A NUMBER LINE



1. Write the fraction that is represented by each of the following points.

A ______________ C ______________ E ______________

B ______________ D ______________ F ______________



Write the fraction for each letter:

2. A ______________________ 4. C ______________________

3. B ______________________ 5. D ______________________

Locate and label these fractions on the number line:

6. $\frac{13}{5}$ as R 8. $\frac{4}{5}$ as T 10. $\frac{0}{5}$ as W

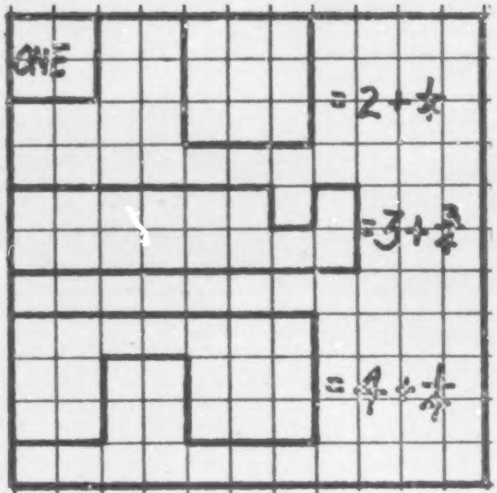
7. $\frac{19}{5}$ as S 9. $\frac{15}{5}$ as U 11. $\frac{7}{5}$ as X

SUM FOR MIXED NUMBERS

Write the natural number that represents how many times the figure labeled "one" is shown in each of the larger figures.

Then, write the fraction which represents the remainder.

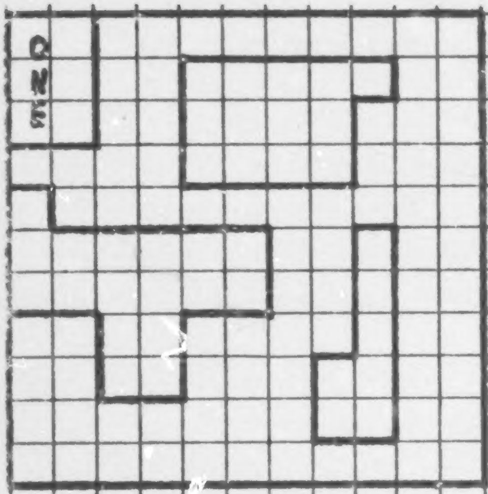
Example →



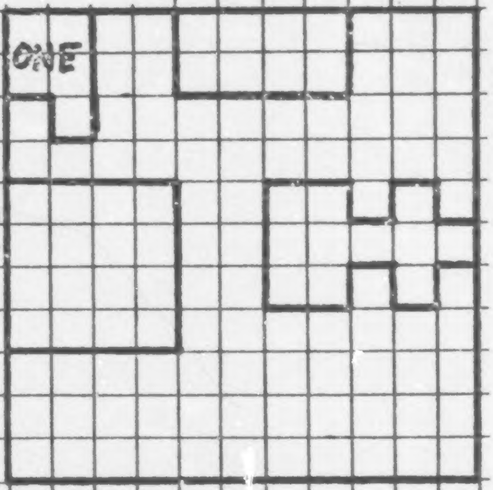
$= 2 + \frac{1}{4}$

$= 3 + \frac{3}{4}$

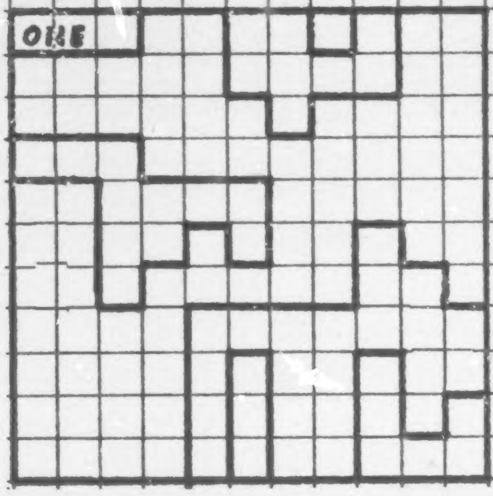
$= 4 + \frac{1}{4}$



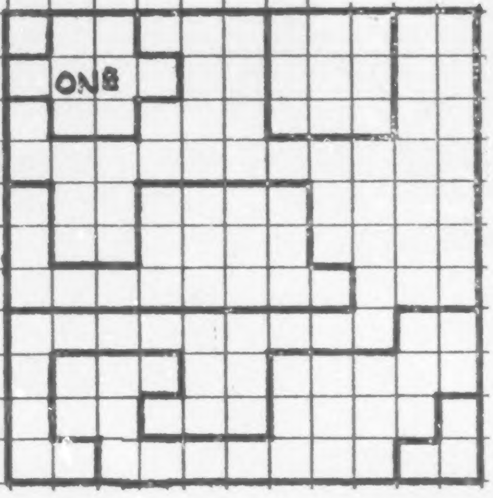
1.



2.



3.



4.

IMPROPER FRACTIONS

1. Draw a line 4" long, and divide it into inches and quarter inches.

How many ¼" are there in each of the following?

a. 1" = ________

b. $1\frac{1}{4}''$ = ________

c. $1\frac{1}{2}''$ = ________

d. $1\frac{3}{4}''$ = ________

e. 2" = ________

f. $2\frac{1}{4}''$ = ________

g. $2\frac{1}{2}''$ = ________

h. $2\frac{3}{4}''$ = ________

i. 3" = ________

j. $3\frac{1}{4}''$ = ________

k. $3\frac{1}{2}''$ = ________

l. $3\frac{3}{4}''$ = ________

2. In the spaces beside the fraction, draw the correct lengths:

a. $\frac{9}{4}$

b. $\frac{13}{4}$

c. $\frac{5}{4}$

d. $\frac{3}{4}$

e. $\frac{2}{4}$

f. $\frac{10}{4}$

3. Consider the following fractions of inches. Which are larger than 1 inch? Circle them. $\frac{7''}{9}$, $\frac{4''}{7}$, $\frac{6''}{5}$, $\frac{11''}{12}$, $\frac{15''}{11}$, $\frac{14''}{12}$, $\frac{9''}{8}$, $\frac{5''}{4}$, $\frac{11''}{5}$, $\frac{3''}{8}$, $\frac{11''}{10}$

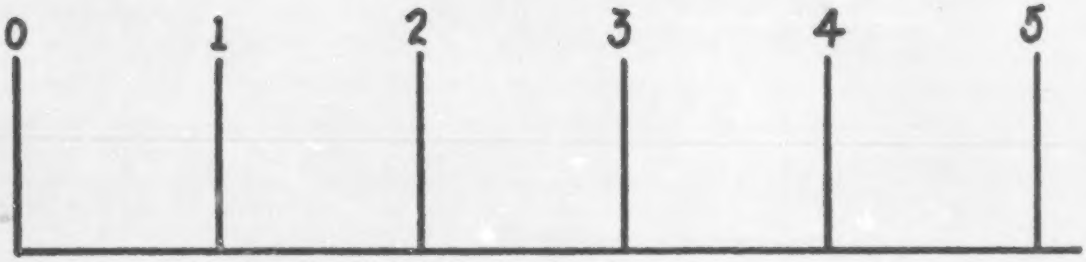
IMPROPER FRACTIONS

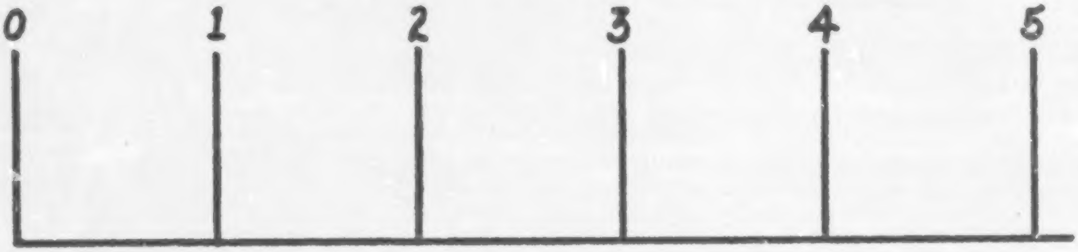
4. If the numerator is larger than the denominator, we call them IMPROPER FRACTIONS.

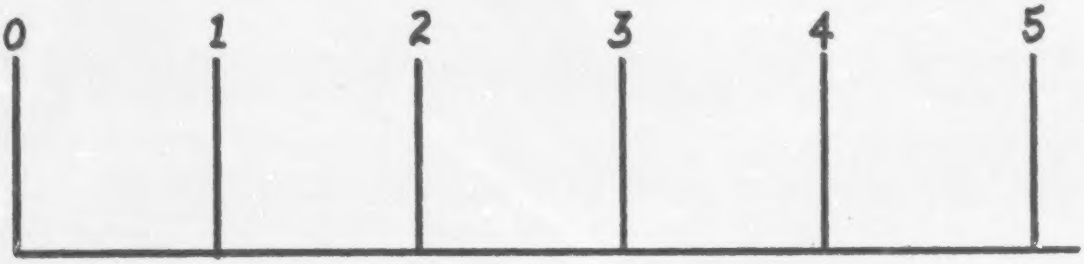
Given below are fractions. Identify the numerator and denominator in the proper columns and then tell whether the fraction is proper or improper.

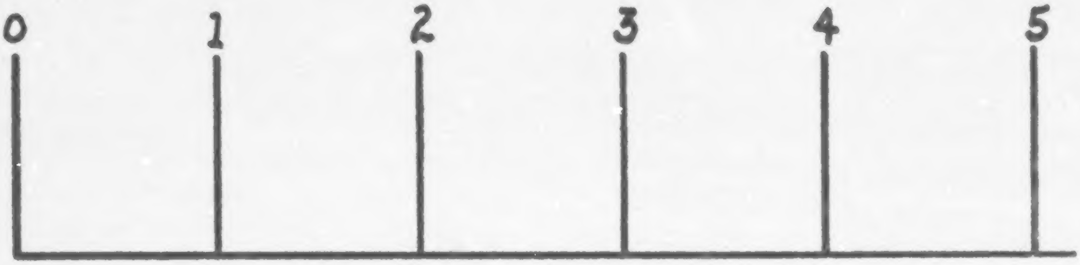
FRACTION	NUMERATOR	DENOMINATOR	PROPER or IMPROPER
a. $\frac{3}{4}$			
b. $\frac{7}{3}$			
c. $\frac{9}{8}$			
d. $\frac{5}{6}$			
e. $\frac{4}{3}$			

NUMBER LINES AND FRACTIONS









COMPARING FRACTIONAL NUMERALS

Circle ○ the smallest fractional numeral in each set. Put a square □ around the largest fractional numeral in each group.

1. $\frac{4}{5}$ $\frac{2}{5}$ $\boxed{\frac{5}{5}}$ $\frac{3}{5}$ $\enclose{circle}{\frac{1}{5}}$
2. $\frac{3}{8}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{6}{8}$ $\frac{2}{8}$
3. $\frac{3}{7}$ $\frac{1}{7}$ $\frac{6}{7}$ $\frac{4}{7}$ $\frac{7}{7}$
4. $\frac{8}{12}$ $\frac{4}{12}$ $\frac{11}{12}$ $\frac{3}{12}$ $\frac{10}{12}$
5. $\frac{2}{12}$ $\frac{6}{12}$ $\frac{3}{6}$ $\frac{4}{6}$ $\frac{3}{12}$
6. $\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{4}$ $\frac{2}{2}$ $\frac{2}{4}$
7. $\frac{2}{12}$ $\frac{8}{12}$ $\frac{2}{6}$ $\frac{10}{12}$ $\frac{4}{6}$
8. $\frac{2}{3}$ $\frac{3}{9}$ $\frac{6}{9}$ $\frac{5}{9}$ $\frac{7}{9}$
9. $\frac{5}{6}$ $\frac{2}{3}$ $\frac{1}{6}$ $\frac{1}{3}$ $\frac{4}{6}$
10. $\frac{2}{10}$ $\frac{3}{5}$ $\frac{4}{10}$ $\frac{3}{10}$ $\frac{4}{5}$
11. $\frac{1}{12}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{1}$
12. $\frac{2}{3}$ $\frac{8}{12}$ $\frac{1}{3}$ $\frac{4}{6}$ $\frac{5}{6}$
13. $\frac{2}{4}$ $\frac{1}{3}$ $\frac{3}{4}$ $\frac{3}{12}$ $\frac{5}{12}$
14. $\frac{6}{12}$ $\frac{4}{12}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{8}{12}$
15. $\frac{4}{8}$ $\frac{3}{8}$ $\frac{7}{8}$ $\frac{4}{9}$ $\frac{7}{8}$
16. $\frac{6}{7}$ $\frac{1}{6}$ $\frac{3}{7}$ $\frac{5}{6}$ $\frac{1}{7}$
17. $\frac{5}{12}$ $\frac{3}{8}$ $\frac{7}{9}$ $\frac{7}{12}$ $\frac{3}{4}$
18. $\frac{5}{9}$ $\frac{2}{5}$ $\frac{9}{10}$ $\frac{1}{2}$ $\frac{7}{12}$
19. $\frac{3}{5}$ $\frac{4}{10}$ $\frac{3}{8}$ $\frac{2}{10}$ $\frac{2}{9}$
20. $\frac{4}{7}$ $\frac{7}{12}$ $\frac{3}{8}$ $\frac{2}{9}$ $\frac{9}{10}$
21. $\frac{7}{12}$ $\frac{9}{12}$ $\frac{5}{6}$ $\frac{3}{4}$ $\frac{3}{16}$
22. $\frac{9}{16}$ $\frac{7}{8}$ $\frac{11}{12}$ $\frac{3}{4}$ $\frac{2}{9}$
23. $\frac{7}{9}$ $\frac{5}{8}$ $\frac{6}{16}$ $\frac{3}{10}$ $\frac{8}{9}$
24. $\frac{1}{3}$ $\frac{6}{7}$ $\frac{7}{12}$ $\frac{3}{12}$ $\frac{3}{10}$
25. $\frac{7}{16}$ $\frac{3}{10}$ $\frac{1}{3}$ $\frac{5}{12}$ $\frac{4}{9}$

(Some groups have equivalent fractions. Now go back and put a triangle △ around equivalent fractions in each of the groups which have them.)

Y CROSS MULTIPLY?

If you want to check quickly and see if two fractions are equivalent, try this way: multiply the numerator of one "times" the denominator of the other. If your two products are equal, then the fractions are equivalent (different names for the same number).

Below are two examples. Arrows are drawn to illustrate the pairs we are multiplying.

Example I:

$$\frac{3}{4} \quad \frac{9}{12} \qquad \begin{array}{l} \rightarrow 4 \times 9 = 36 \\ \rightarrow 3 \times 12 = 36 \end{array}$$

These are equivalent (36 = 36).

Example II:

$$\frac{5}{6} \quad \frac{10}{18} \qquad \begin{array}{l} \rightarrow 6 \times 10 = 60 \\ \rightarrow 5 \times 18 = 90 \end{array}$$

These are not equivalent (60 "is not equal to" 90).

Use the idea of "cross multiplying" to decide if the pair of fractions below are equivalent.

1. $\frac{2}{3}$ and $\frac{9}{12}$

2. $\frac{3}{4}$ and $\frac{12}{16}$

3. $\frac{9}{10}$ and $\frac{27}{30}$

4. $\frac{11}{12}$ and $\frac{55}{72}$

5. $\frac{7}{8}$ and $\frac{14}{16}$

6. $\frac{1}{9}$ and $\frac{10}{90}$

RENAME FOR ORDER

Part I: In the problems below, first rename the fractions so that the denominators are equal:

Example: $\frac{3}{5}, \frac{3}{4}$

Solution: $\frac{3\,(4)}{5\,(4)} = \frac{12}{20}$ $\frac{3\,(5)}{4\,(5)} = \frac{15}{20}$

Next: place the correct symbol (">" is greater than, "<" is less than) between them.

Since: in our problem above, $(\frac{12}{20}, \frac{15}{20})$

12 "is less than" 15, then $\frac{12}{20} < \frac{15}{20}$, and $\frac{3}{5} < \frac{3}{4}$.

Now, following the same directions given above, put the correct sign in the problems below.

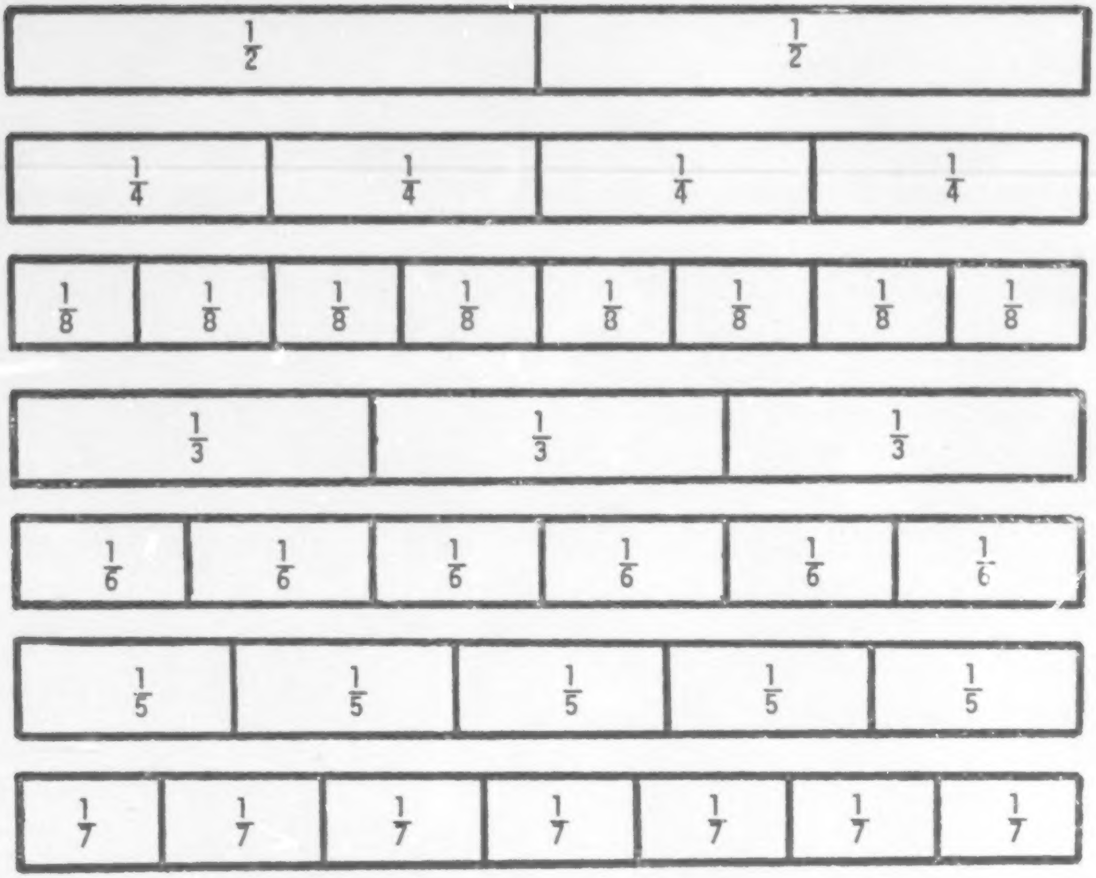
1. $\frac{1}{2}, \frac{1}{3}$
2. $\frac{3}{8}, \frac{2}{5}$
3. $\frac{1}{4}, \frac{1}{3}$
4. $\frac{3}{4}, \frac{1}{2}$

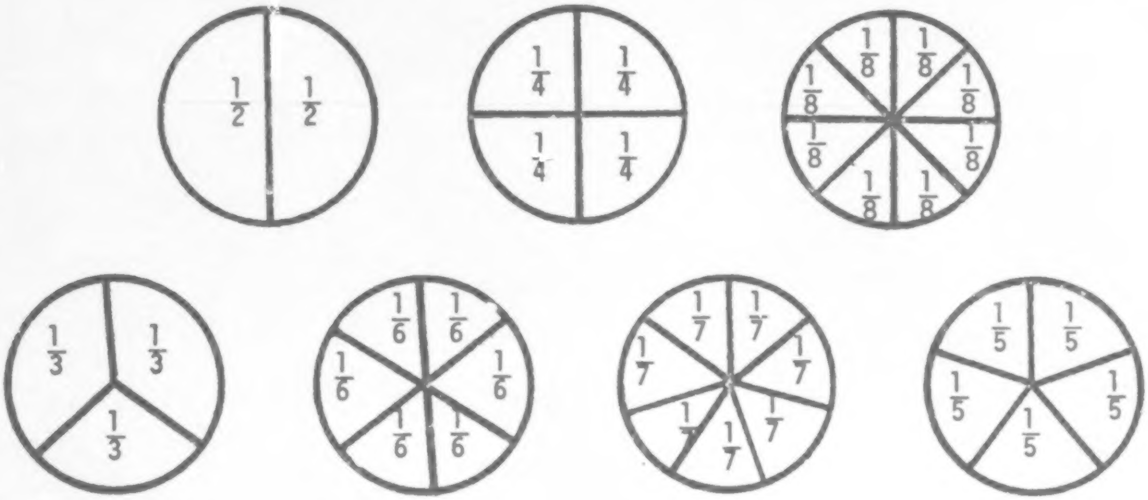
Part II: Rewrite the three fractions in each exercise below so that the denominators are equal, and arrange the fractions in order "smallest" to "largest."

5. $\frac{2}{3}, \frac{3}{5}, \frac{1}{2}$
6. $\frac{5}{6}, \frac{6}{7}, \frac{3}{4}$
7. $\frac{1}{2}, \frac{2}{3}, \frac{9}{12}$
8. $\frac{5}{6}, \frac{4}{12}, \frac{9}{12}$

CUT FOR ORDER

Cut out the following:


1/2 1/2
1/4 1/4 1/4 1/4
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
1/3 1/3 1/3
1/6 1/6 1/6 1/6 1/6 1/6
1/5 1/5 1/5 1/5 1/5
1/7 1/7 1/7 1/7 1/7 1/7 1/7


1/2 1/2
1/4 1/4 1/4 1/4
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
1/3 1/3 1/3
1/6 1/6 1/6 1/6 1/6 1/6
1/7 1/7 1/7 1/7 1/7 1/7 1/7
1/5 1/5 1/5 1/5 1/5

CUT FOR ORDER

1. Using the drawings (first the rectangles and then the circles), place the symbol <, >, or = between the numerals so that the following statements are correct.

   a. $\frac{1}{2} \qquad \frac{1}{4}$

   b. $\frac{1}{5} \qquad \frac{1}{3}$

   c. $\frac{1}{5} \qquad \frac{1}{7}$

   d. $\frac{1}{2} \qquad \frac{2}{4}$

   e. $\frac{2}{5} \qquad \frac{3}{7}$

   f. $\frac{2}{5} \qquad \frac{3}{8}$

   g. $\frac{1}{3} + \frac{1}{3} \qquad \frac{1}{6} + \frac{3}{6}$

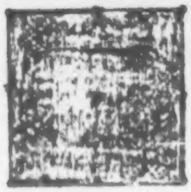
   h. $\frac{1}{7} + \frac{2}{7} \qquad \frac{1}{5} + \frac{1}{5}$

2. Using the drawings (first the rectangles and then the circles), rearrange the following numerals so that you can use the symbol < to make true statements.

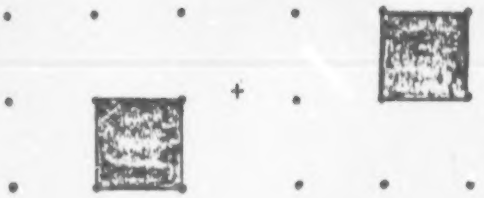
   a. $\frac{1}{3} \qquad \frac{2}{7} \qquad \frac{2}{3} \qquad \frac{1}{2} \qquad \frac{1}{6} \qquad \frac{3}{4}$

   b. $\frac{1}{3} + \frac{1}{3} \qquad \frac{1}{5} + \frac{2}{5} \qquad \frac{1}{3} \qquad \frac{1}{2} + \frac{1}{3}$

BOUND TO ADD

If we agree  is 1, then the shaded areas in each picture =

)



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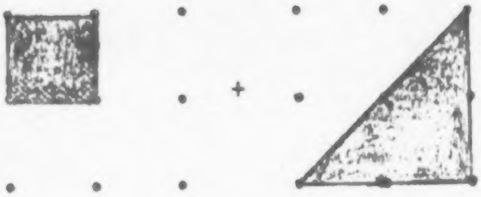

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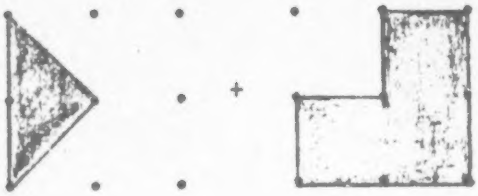

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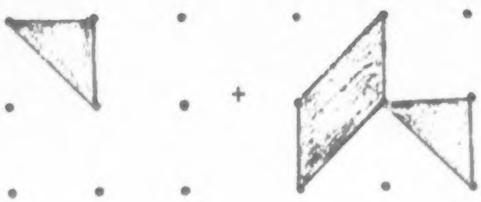

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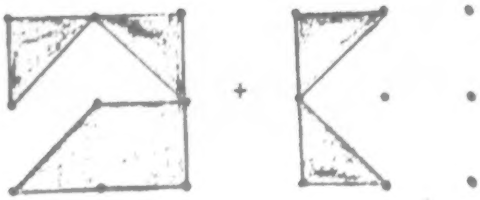

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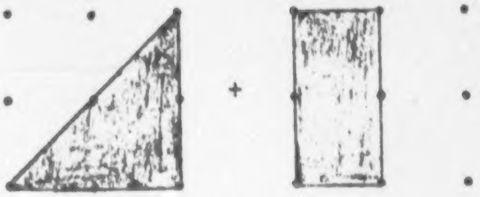

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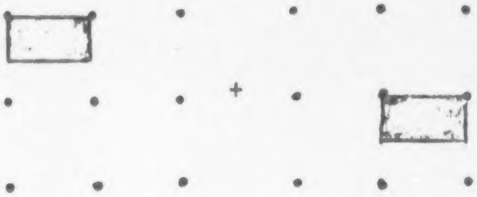

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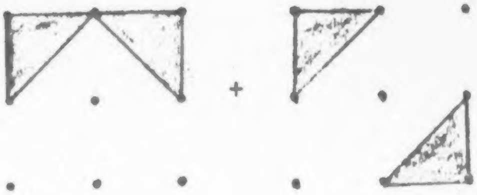

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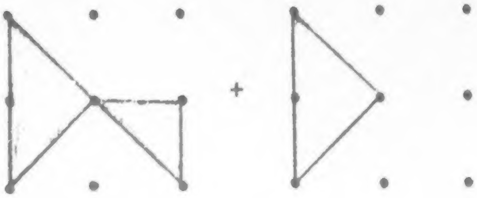

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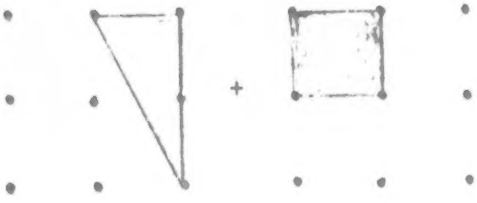

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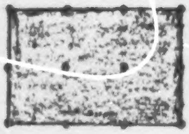
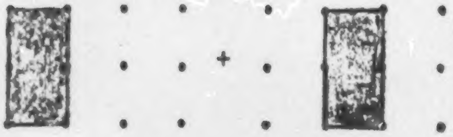
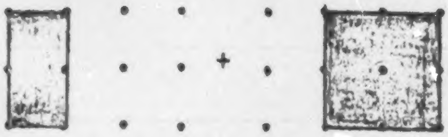
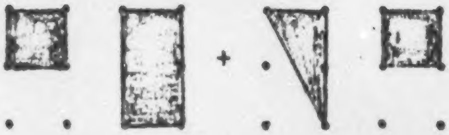
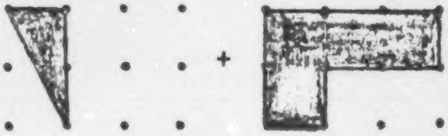
BOUND TO ADD

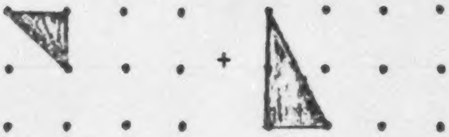
If we agree  is 1, then the shaded areas in each picture =

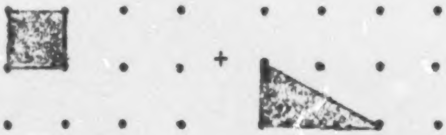
11)  = _

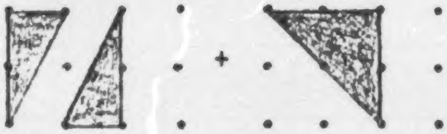
12)  = _

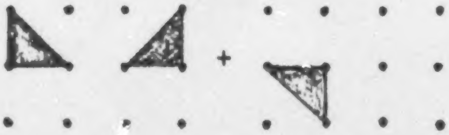
13)  = _

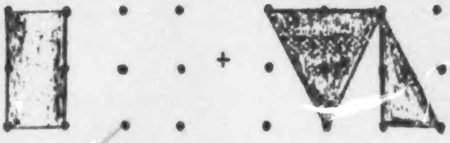
14)  = _

15)  = _

16)  = _

17)  = _

18)  = _

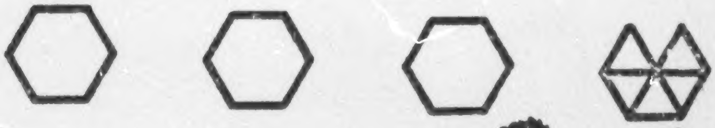
19)  = _

L-22

SUBTRACTING MIXED NUMBERS

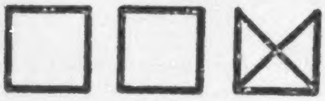
1. $3\frac{5}{6} - 1\frac{4}{6}$ means to take $1\frac{4}{6}$ from $3\frac{5}{6}$.

Use the diagram below to find $3\frac{5}{6} - 1\frac{4}{6}$. Shade $1\frac{4}{6}$. How much is left unshaded? __________



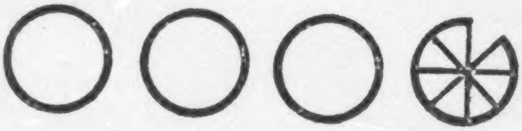
2. Using the following diagrams, find:

a) $2\frac{3}{4} - 2\frac{1}{4}$



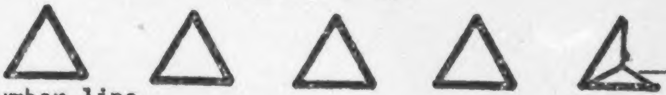
____

b) $3\frac{7}{8} - 2\frac{5}{8}$



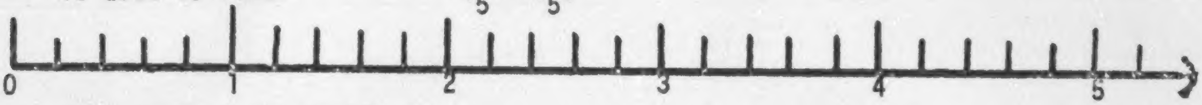
____

c) $4\frac{2}{3} - 1\frac{2}{3}$



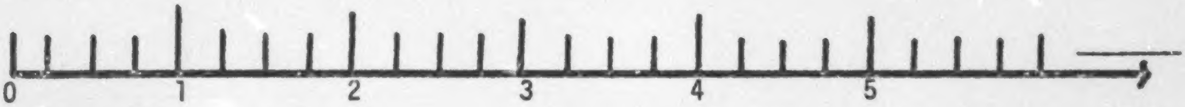
____

3. Explain how the number line is used to find: $4\frac{3}{5} - 1\frac{1}{5}$.



4. Work each of the problems of exercise 2 on a number line.

a.



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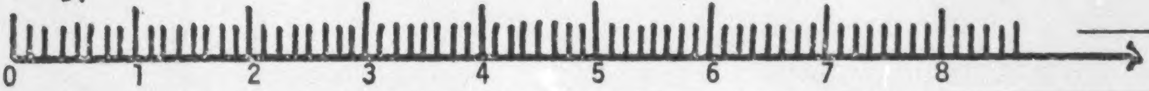
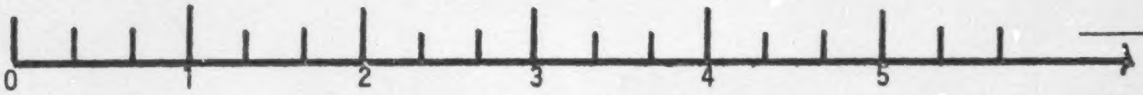
b.



____

c.



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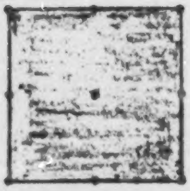
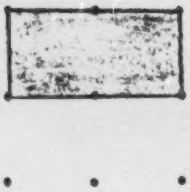
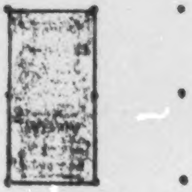
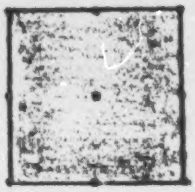
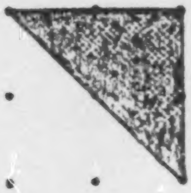
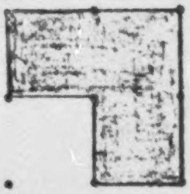
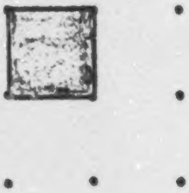
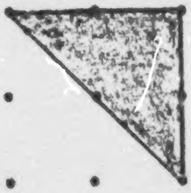
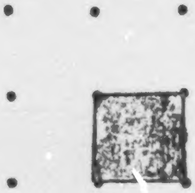
MORE FENCES

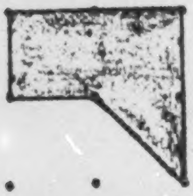
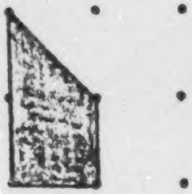
If we agree  is 1, then the shaded areas in each picture =

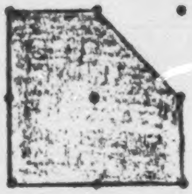
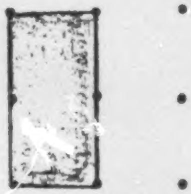
)  -  = _

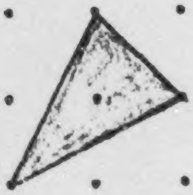
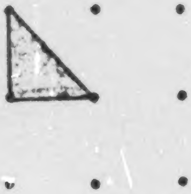
5)  -  = _

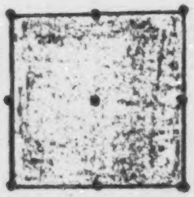
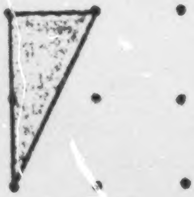
)  -  = _

6)  -  = _

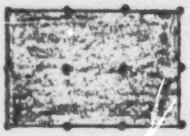
)  -  = _

7)  -  = _

)  -  = _

8)  -  = _

MORE FENCES II

If we agree  is 1, then the shaded areas in each picture =

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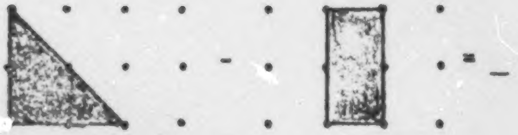

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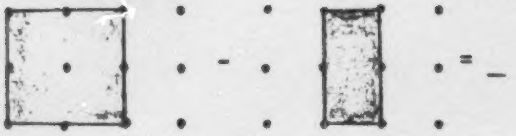

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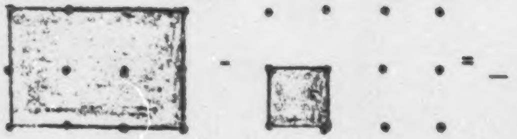

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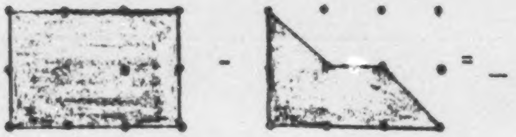

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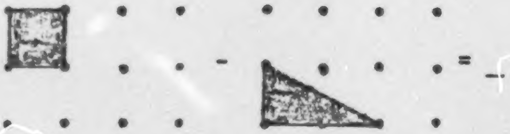

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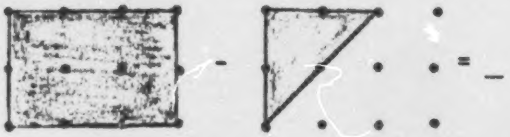

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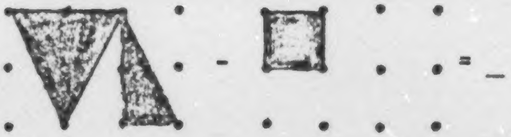

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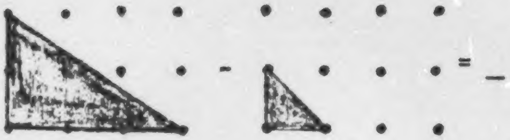
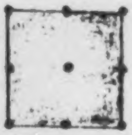
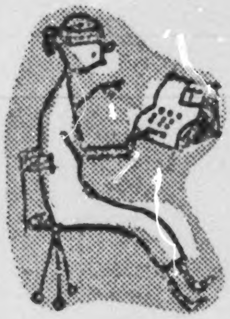
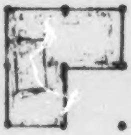
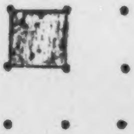
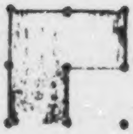
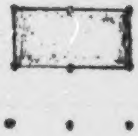


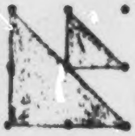
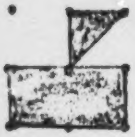
MORE FENCES III

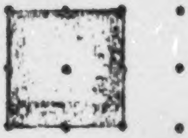
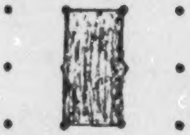
If one is  then .....

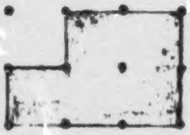
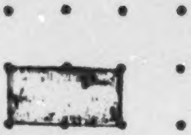


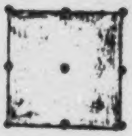
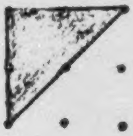
1)  -  = ___

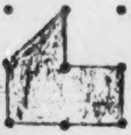
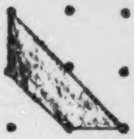
2)  -  = ___

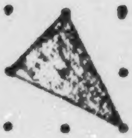
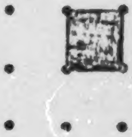
3)  -  = ___

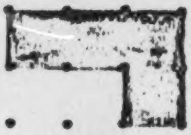
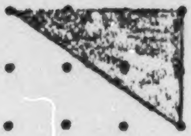
4)  -  = ___

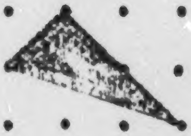
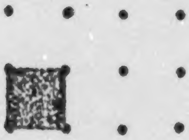
5)  -  = ___

6)  -  = ___

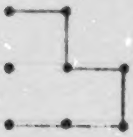
7)  -  = ___

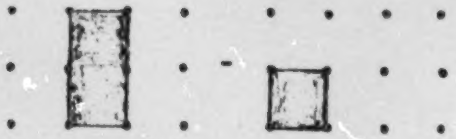
8)  -  = ___

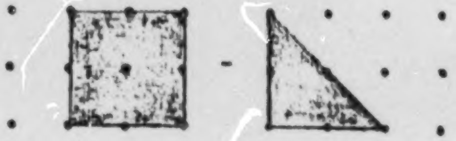
9)  -  = ___

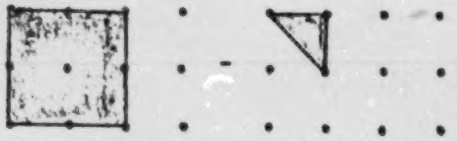
10)  -  = ___

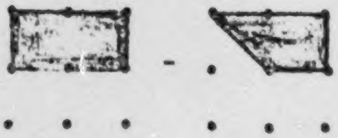
MORE FENCES IV

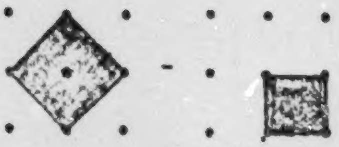
if  is one, then,

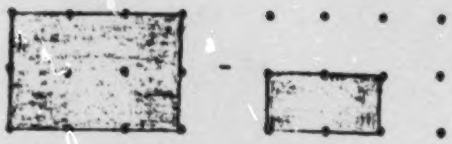
1)  = ___

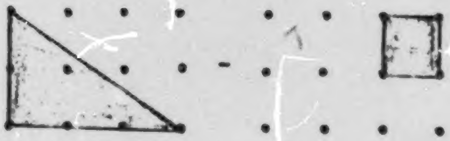
2)  = ___

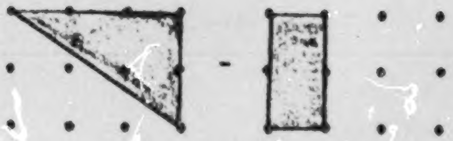
3)  = ___

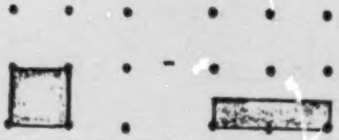
4)  = ___

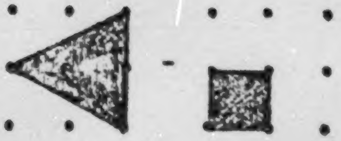
5)  = ___

6)  = ___

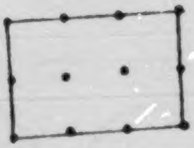
7)  = ___

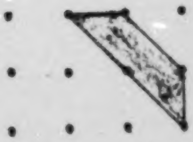
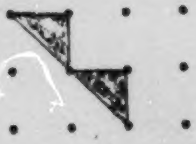
8)  = ___

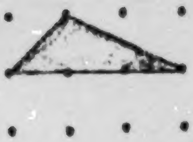
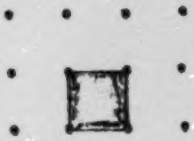
9)  = ___

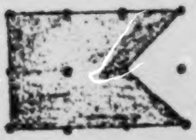
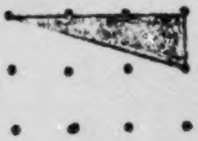
10)  = ___

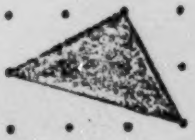
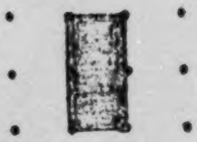
MORE FENCES V

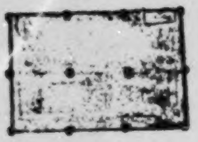
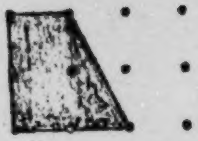
if  is one, then,

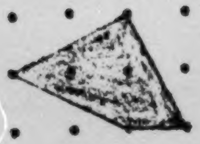
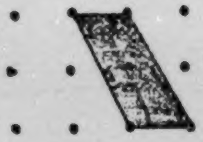
1)  -  = ___

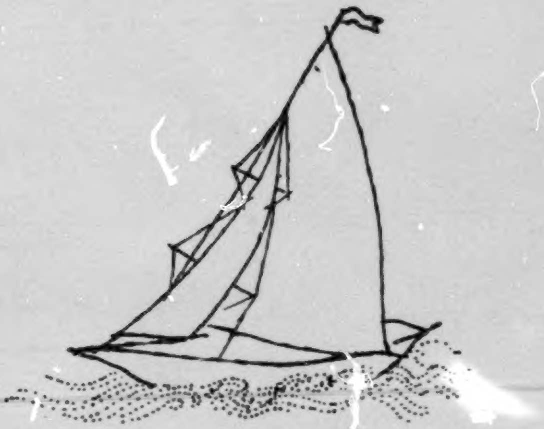
2)  -  = ___

3)  -  = ___

4)  -  = ___

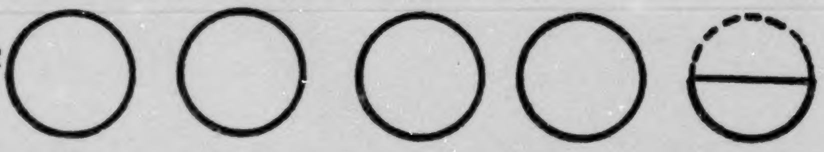
5)  -  = ___

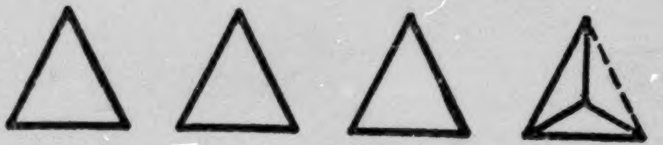
6)  -  = ___

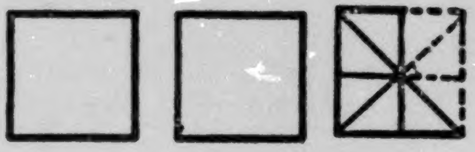


PICTURE SUBTRACTION

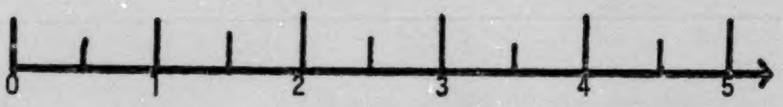
1. Use the diagrams to find:

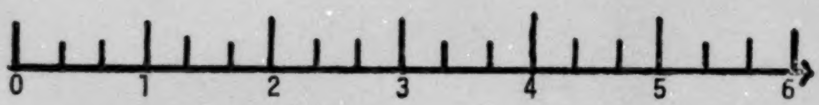
a. $4\frac{1}{2} - 2$  ________

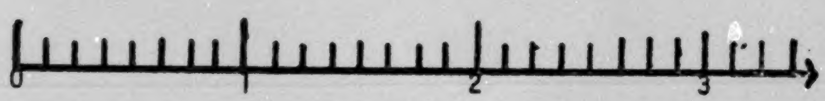
b. $3\frac{2}{3} - 1$  ________

c. $2\frac{5}{8} - 2$  ________

2. Use the number line to find:

a. $4\frac{1}{2} - 2$ ________ 

b. $3\frac{2}{3} - 1$ ________ 

c. $2\frac{5}{8} - 2$ ________ 

3. Find:

a. $6\frac{3}{4} - 4 =$ ________

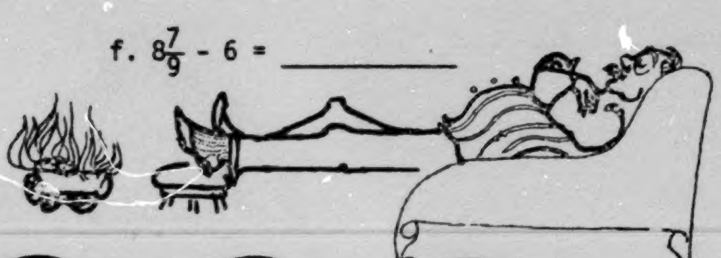
b. $5\frac{7}{8} - 2 =$ ________

c. $7\frac{4}{5} - 3 =$ ________

d. $1\frac{1}{2} - 1 =$ ________

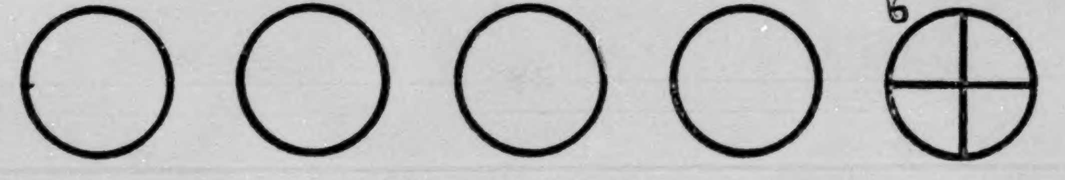
e. $3\frac{2}{3} - 2 =$ ________

f. $8\frac{7}{9} - 6 =$ ________



4. Use the diagram below to find:

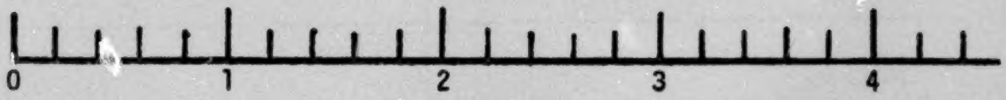
$5 - 3\frac{1}{4}$



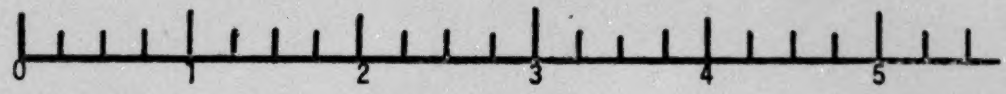
PICTURE SUBTRACTION

5. Show how you would use a number line to find:

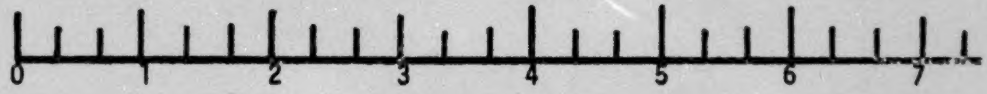
a. $3\frac{2}{5} - 1\frac{4}{5}$



b. $5\frac{2}{4} - 2\frac{3}{4}$

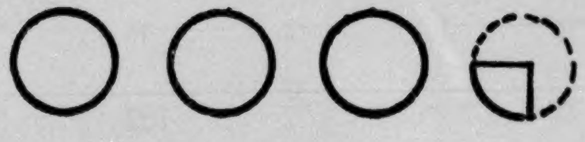


c. $6\frac{1}{3} - 4\frac{2}{3}$



6. Use the diagram to subtract

$1\frac{3}{4}$ from $3\frac{1}{4}$

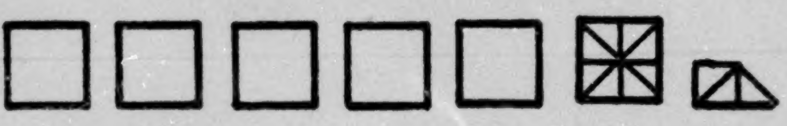


a. What must you do before you can shade $1\frac{3}{4}$? ________________

b. How much is left after you shade $1\frac{3}{4}$? ________________

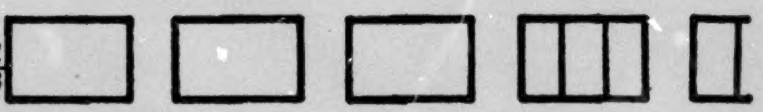
7. Use the diagrams below to find:

a. $6\frac{3}{8} - 4\frac{7}{8}$



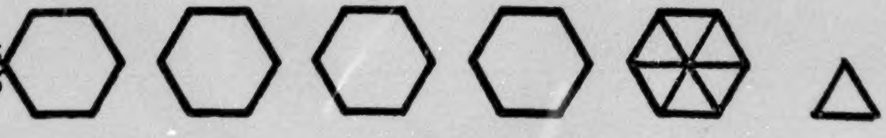
____

b. $4\frac{1}{3} - 1\frac{2}{3}$



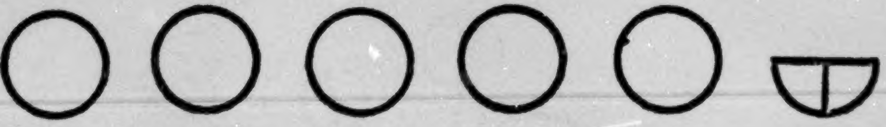
____

c. $5\frac{1}{6} - 2\frac{5}{6}$



____

d. $5\frac{2}{4} - 1\frac{3}{4}$

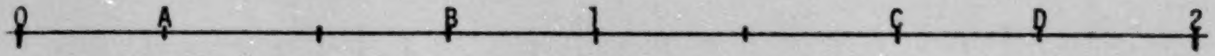


____

e. In order to find the answers for a - d, what did you have to do to one of the units in each problem? ______________________________

EQUIVALENT FRACTIONS

I. Supply the missing numerators:



$\frac{0}{1}$				$\frac{1}{1}$				$\frac{2}{1}$
$\frac{0}{2}$		$\frac{1}{2}$		$\frac{2}{2}$		$\frac{3}{2}$		$\frac{4}{2}$
$\frac{}{4}$	$\frac{}{4}$	$\frac{}{4}$	$\frac{}{4}$	$\frac{4}{4}$	$\frac{}{4}$	$\frac{}{4}$	$\frac{}{4}$	$\frac{}{4}$
$\frac{}{8}$	$\frac{}{8}$	$\frac{}{8}$	$\frac{}{8}$	$\frac{8}{8}$	$\frac{}{8}$	$\frac{}{8}$	$\frac{}{8}$	$\frac{}{8}$
$\frac{}{16}$	$\frac{}{16}$	$\frac{}{16}$	$\frac{}{16}$	$\frac{16}{16}$	$\frac{}{16}$	$\frac{}{16}$	$\frac{}{16}$	$\frac{}{16}$
$\frac{}{32}$	$\frac{}{32}$	$\frac{}{32}$	$\frac{}{32}$	$\frac{32}{32}$	$\frac{}{32}$	$\frac{}{32}$	$\frac{}{32}$	$\frac{}{32}$
$\frac{}{64}$	$\frac{}{64}$	$\frac{}{64}$	$\frac{}{64}$	$\frac{64}{64}$	$\frac{}{64}$	$\frac{}{64}$	$\frac{}{64}$	$\frac{}{64}$

II. Write all the equivalent fractions for:

1. Point A

2. Point B

3. Point C

4. Point D

EQUIVALENT FRACTIONS

III. Expand: Divide the number line below into your own units and fill in the chart below in the same manner as on the previous page.

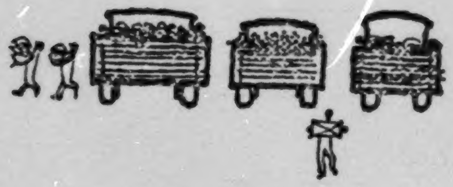
0 ____ .

— — — — — — — — —

— — — — — — — — —

— — — — — — — — —

— — — — — — — — —



COVER-UP

Cut out the eight large rectangles on the next page, label them A - H, and use them to answer the following questions.

1. How many $\frac{1}{6}$ blocks do you need to cover $\frac{8}{12}$ of the H rectangle?

2. How many $\frac{1}{12}$ blocks do you need to cover $\frac{5}{6}$ of the G rectangle?

3. How many $\frac{1}{3}$ blocks are in $\frac{8}{12}$ of the H rectangle?

4. How many $\frac{1}{12}$ blocks do you need to cover $\frac{1}{2}$ of rectangle B?

Use the rectangles to find the following. Use more than one name in the answer when possible.

5. $\frac{1}{2} + \frac{1}{3}$ __________

6. $\frac{3}{8} + \frac{3}{8}$ __________

7. $\frac{2}{3} + \frac{1}{4}$ __________

8. $\frac{2}{4} + \frac{1}{3}$ __________

9. $\frac{1}{4} + \frac{2}{3}$ __________

10. $\frac{1}{2} + \frac{1}{4}$ __________

11. $\frac{1}{6} + \frac{1}{3}$ __________

12. $\frac{2}{3} + \frac{1}{6}$ __________

13. $\frac{1}{2} + \frac{1}{12}$ __________

14. $\frac{1}{3} + \frac{4}{6}$ __________

15. $\frac{1}{3} + \frac{1}{8}$ __________

16. $\frac{1}{6} + \frac{3}{4}$ __________

17. $\frac{1}{12} + \frac{2}{3}$ __________

18. $\frac{1}{4} + \frac{3}{4}$ __________

19. $\frac{2}{3} - \frac{11}{22}$ __________

20. $\frac{3}{4} - \frac{1}{3}$ __________

21. $\frac{2}{3} - \frac{1}{8}$ __________

22. $\frac{5}{6} - \frac{1}{2}$ __________

23. $\frac{2}{3} - \frac{1}{3}$ __________

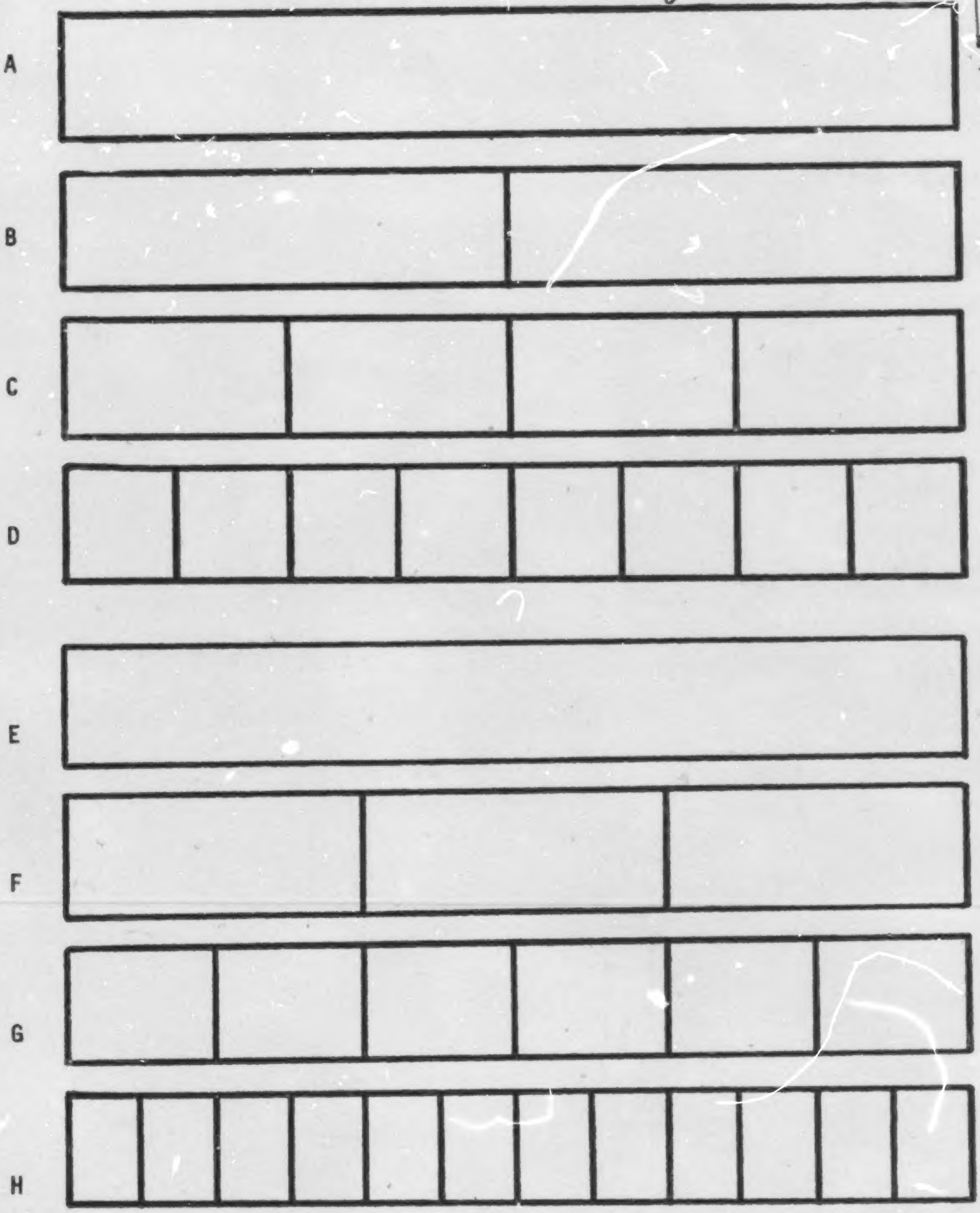
24. $\frac{5}{6} - \frac{1}{3}$ __________

25. $\frac{3}{4} - \frac{2}{3}$ __________

If two fractions are equal, write equal.

If the fractions are not equal, circle the larger fraction.

COVER-UP



FRACTIONS AREN'T WHAT THEY USED TO BE!

Use your ruler to find the missing numerators and denominators in the following fractions.

1. $\frac{5}{8} = \frac{1}{\underline{\quad}} + \frac{\underline{\quad}}{8}$

2. $\frac{3}{8} = \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}}$

3. $\frac{9}{16} = \frac{1}{2} + \frac{1}{\underline{\quad}}$

4. $\underline{\quad} = \frac{1}{2} + \frac{1}{4}$

5. $\frac{7}{8} = \frac{1}{2} + \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}}$

6. $\frac{3}{16} = \frac{1}{\underline{\quad}} + \underline{\quad}$

7. $\frac{7}{16} = \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}} + \frac{\underline{\quad}}{16}$

8. $\frac{9}{16} = \underline{\quad} + \underline{\quad}$

9. $\frac{11}{16} = \underline{\quad} + \underline{\quad} + \underline{\quad}$

10. $\frac{13}{16} = \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}}$

11. $\frac{3}{32} = \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}}$

12. $\frac{5}{32} = \underline{\quad} + \underline{\quad}$

13. $\frac{7}{32} = \frac{\underline{\quad}}{8} + \frac{1}{\underline{\quad}} + \frac{1}{\underline{\quad}}$

14. $\frac{13}{32} = \underline{\quad} + \underline{\quad} + \underline{\quad}$

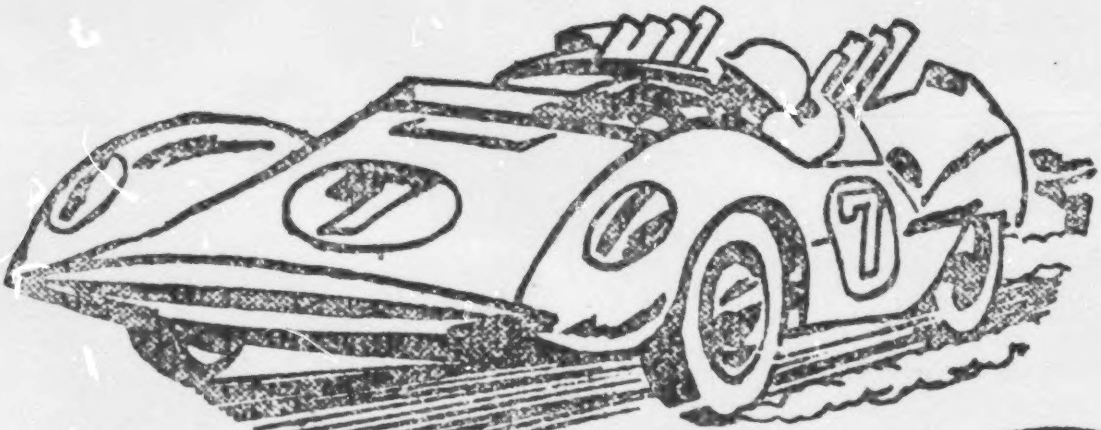
15. $\frac{15}{16} = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$

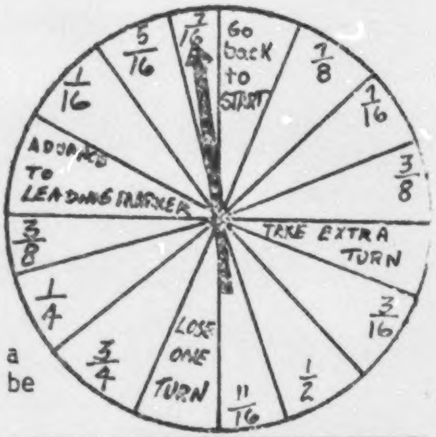
16. $\frac{15}{32} = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$

17. $\frac{21}{32} = \underline{\quad} + \underline{\quad} + \underline{\quad}$

18. $\frac{27}{32} = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$

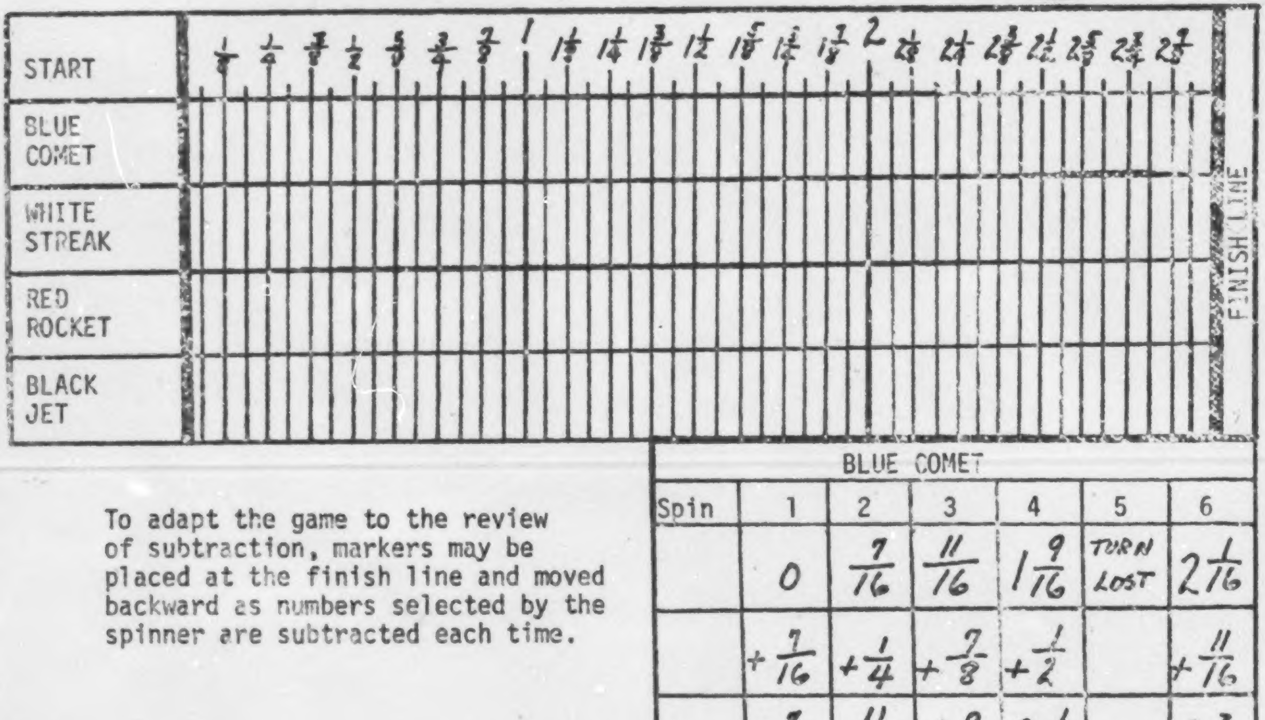
RACEWAY




$\frac{7}{16}$
Go back to START
$\frac{7}{8}$
$\frac{1}{16}$
$\frac{3}{8}$
TAKE EXTRA TURN
$\frac{3}{16}$
$\frac{1}{2}$
$\frac{11}{16}$
LOSE ONE TURN
$\frac{3}{4}$
$\frac{1}{4}$
$\frac{3}{8}$
ADVANCE TO LEADING MARKER
$\frac{1}{16}$
$\frac{5}{16}$

DIRECTIONS: Prepare a playing board and a spinner similar to the one shown opposite.

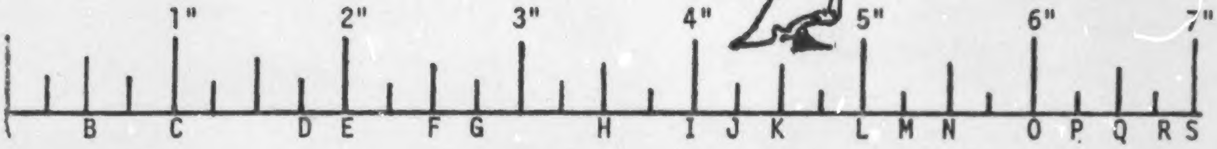
For the playing board shown, 4 players (or 4 teams) may compete, and each should be provided with a marker, such as the cut-out of a racer. At the start, all markers should be placed at the starting line, and players should take turns twirling the spinner to determine how far to advance the racers each time. This continues until one car finishes and is declared the winner. Each pupil should keep a score sheet similar to the one below. These should be checked at the end of the game for correctness.


START
$\frac{1}{8}$
$\frac{1}{4}$
$\frac{3}{8}$
$\frac{1}{2}$
$\frac{5}{8}$
$\frac{3}{4}$
$\frac{7}{8}$
1
$1\frac{1}{8}$
$1\frac{1}{4}$
$1\frac{3}{8}$
$1\frac{1}{2}$
$1\frac{5}{8}$
$1\frac{3}{4}$
$1\frac{7}{8}$
2
$2\frac{1}{8}$
$2\frac{1}{4}$
$2\frac{3}{8}$
$2\frac{1}{2}$
$2\frac{5}{8}$
$2\frac{3}{4}$
$2\frac{7}{8}$
BLUE COMET
WHITE STREAK
RED ROCKET
BLACK JET
FINISH LINE

To adapt the game to the review of subtraction, markers may be placed at the finish line and moved backward as numbers selected by the spinner are subtracted each time.

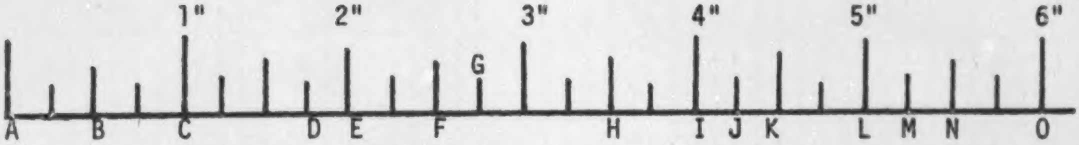
BLUE COMET						
Spin	1	2	3	4	5	6
	0	$\frac{7}{16}$	$\frac{11}{16}$	$1\frac{9}{16}$	TURN LOST	$2\frac{1}{16}$
	$+\frac{7}{16}$	$+\frac{1}{4}$	$+\frac{7}{8}$	$+\frac{1}{2}$		$+\frac{11}{16}$
	$\frac{7}{16}$	$\frac{11}{16}$	$1\frac{9}{16}$	$2\frac{1}{16}$		$2\frac{3}{4}$

USING THE RULER


1"
2"
3"
4"
5"
6"
7"
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S

Write down the lengths of the following, using the ruler above.

1. AH =
2. BE =
3. IO =
4. JM =
5. BK =
6. FP =
7. CR =
8. HM =
9. AG =
10. BE =
11. EL =
12. ER =
13. IM =
14. JQ =
15. FO =
16. GS =
17. BN =
18. CJ =
19. OS =
20. BR =


1"
2"
3"
4"
5"
6"
G
A
B
C
D
E
F
H
I
J
K
L
M
N
O

Using the information in problems 1 - 20 and the number lines above, find the answers to the following addition problems.

21. AH + BE =
22. IO + EL =
23. JM + IM =
24. BK + JQ =
25. FO + CJ =
26. OJ + HM =
27. CR + AB =
28. AG + BE =

PREDICTIONS

Your Pattern

Add 1. $0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}$, ___, ___, ___, ___, ___

2. $1\frac{1}{3}, 1\frac{2}{3}, 2, 2\frac{1}{3}$, ___, ___, ___, ___, ___, ___

Add 3. $\frac{2}{5}, \frac{4}{5}, 1\frac{1}{5}$, ___, ___, ___, ___, ___

4. $5\frac{1}{8}, 4\frac{7}{8}, 4\frac{5}{8}$, ___, ___, ___, $3\frac{5}{8}$, ___, ___

Add $\frac{1}{3}$ 5. $\frac{7}{6}$, ___, ___, ___, ___, ___, ___, ___

6. $\frac{3}{4}, 1\frac{1}{2}, 2\frac{1}{4}$, ___, ___, ___, ___, ___

Subtract $\frac{1}{3}$ 7. $1\frac{5}{6}$, ___, ___, ___, ___, ___

Add 8. $7\frac{1}{2}, 8\frac{3}{4}, 10$, ___, ___, ___, ___

9. $\frac{1}{2}, \frac{9}{16}, \frac{5}{8}$, ___, ___, ___, ___, ___

10. $\frac{7}{5}, 1\frac{3}{5}, 1\frac{4}{5}$, ___, ___, $2\frac{2}{5}$, ___, ___

11. $\frac{9}{16}, \frac{11}{16}, \frac{13}{16}$, ___, ___, ___, ___

12. $9\frac{1}{4}, 9$, ___, ___, $8\frac{1}{4}$, ___, ___, ___

13. $2\frac{1}{6}, 2\frac{3}{12}$, ___, ___, ___, ___

14. $\frac{2}{2}, \frac{3}{2}, 2$, ___, ___, ___, ___

FOLD 'ER UP

Exercise 1:

Cut out and then fold the square in halves, quarters, and eighths. Use it to find the answers to these questions.

a. How many eighths in the square? ____________________

b. How many eighths in half of the square? ________________

c. How many eighths in a quarter of the square? _____________

d. How many eighths in three quarters of the square? _____

Exercise 2:

Fill in the missing number using your folded paper.

a. $1 = \frac{?}{8}$ _____ b. $\frac{1}{4} = \frac{?}{8}$ _____

c. $\frac{1}{2} = \frac{?}{8}$ _____ d. $\frac{3}{4} = \frac{?}{8}$ _____

Exercise 3:

Cut out and then fold the drawing below and answer the same questions you answeredin Exercise 1. a. _______ b. _______ c. _______ d. _______

Exercise 4:

Using your folded pieces of paper, can you find the answers to the following?

a. $\frac{1}{8} + \frac{5}{8} =$ _______

b. $\frac{1}{8} + \frac{1}{8} =$ _______

c. $1 - \frac{1}{8} =$ _______

d. $\frac{1}{2} - \frac{1}{8} =$ _______

e. $\frac{3}{4} + \frac{1}{8} =$ _______

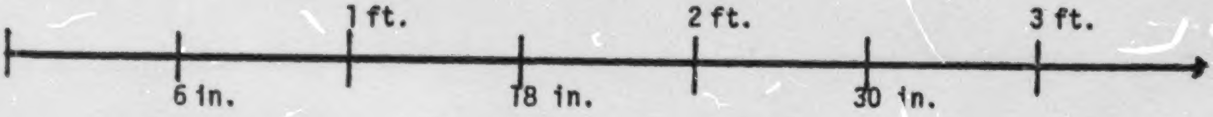
f. $1 - \frac{7}{8} =$ _______

g. $\frac{3}{4} - \frac{3}{8} =$ _______

h. $1 - \frac{3}{8} =$ _______

MEASURE UP

I.



Example: $\frac{2}{3}$ of 1 yard = 24 inches

1. $\frac{\ }{3}$ of 1 yard = 12 inches.

2. $\frac{1}{\ }$ of 1 yard = 12 inches.

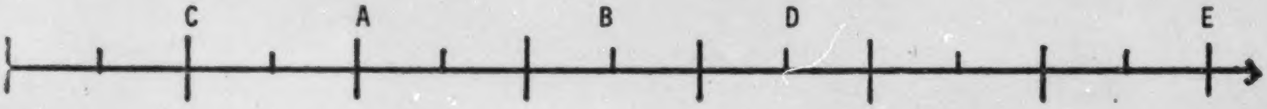
3. — of 1 yard = 27 inches.

4. $\frac{\ }{6}$ of 1 yard = 30 inches.

5. $\frac{\ }{4}$ of 1 yard = 54 inches.

6. — of 1 yard = 18 inches.

II. Use this line to solve A - E.



Example:

If A = 1 ft. = 12 inches = $\frac{1}{3}$ yards,

Then B = _____ ft. = _____ inches = _____ yards,

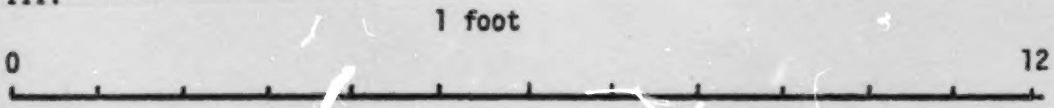
Then C = _____ ft. = _____ inches = _____ yards,

Then D = _____ ft. = _____ inches = _____ yards,

Then E = _____ ft. = _____ inches = _____ yards.

MEASURE UP

III.



1. 1 foot = ______ inches.

2. $\frac{1}{2}$ foot = ______ inches.

3. ______ foot = 4 inches.

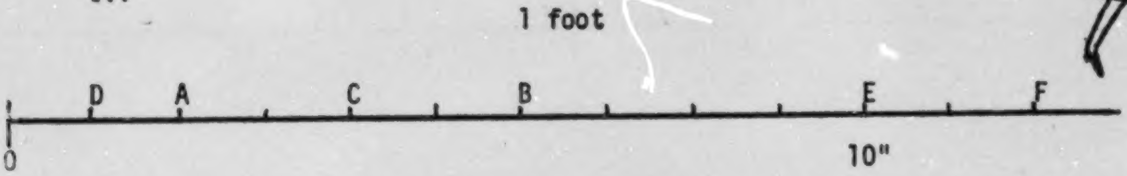
4. $\frac{1}{3}$ foot = ______ inches.

5. ______ foot = 8 inches.

6. $\frac{3}{4}$ foot = ______ inches.

7. $\frac{1}{12}$ foot = ______ inches.

IV.


1 foot
D
A
C
B
E
F
0
10"

A = $\frac{2}{12}$ ft.

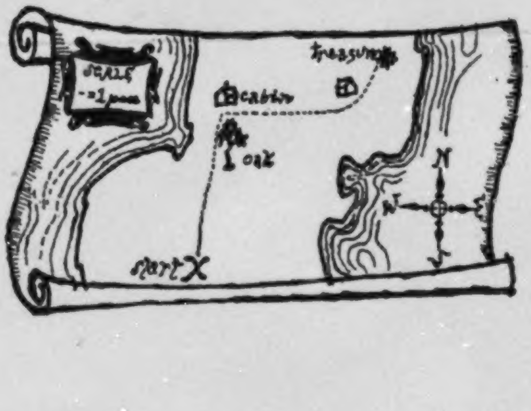
B = ____ ft.

C = ____ ft.

D. ______ ft.

E. ______ ft.

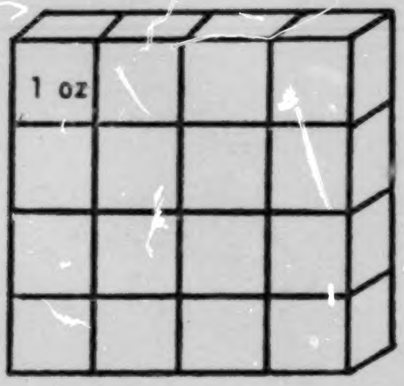
F. ______ ft.


SCALE =1 pace
cabin
treasure
oak
start X
N
W
E
S

L-32B

MEASURE UP

V.



1 pound = 16 ounces

1. $\frac{1}{2}$ pound = ______ ounces.

2. $\frac{1}{4}$ pound = ______ ounces.

3. $\frac{1}{8}$ pound = ______ ounces.

4. 8 ounces = ______ pound.

5. 3 ounces = ______ pound.

6. 2 ounces = ______ pound.

7. 12 ounces = ______ pound.

8. 2 pounds = ______ ounces

9. $1\frac{1}{2}$ pounds = ______ ounces.

10. 20 ounces = ______ pounds.

1 ton = 2000 pounds

11. $\frac{1}{2}$ ton = ______ pounds.

12. 500 pounds = ______ tons.

D = 1

A. Solve the following problems. Use the first as an example.

1. $\frac{1}{2} \times \frac{3}{7} = \frac{1 \times 3}{2 \times 7} = \frac{3}{14}$

2. $\frac{4}{5} \times \frac{8}{9}$

3. $\frac{2}{3} \times \frac{5}{6}$

4. $\frac{9}{10} \times \frac{11}{12}$

5. $\frac{6}{1} \times \frac{5}{1}$

6. $\frac{4}{1} \times \frac{3}{4}$

What do you observe about the denominators in problem 5 and one of the denominators in problem 6?

A number can be written in many different ways.

For example: $4 = \frac{4}{1}$ $6 = \frac{6}{1}$

Find the answer: $5 \times \frac{3}{4} =$

$5 \times \frac{3}{4}$ can be written as: $\frac{5}{1} \times \frac{3}{4} = \frac{5 \times 3}{1 \times 4} = \frac{15}{4}$

B. Mentally (without pencil and paper) give the answer for each of the following problems.

1. $4 \times \frac{1}{2} =$ ______

2. $\frac{1}{4} \times \frac{1}{5} =$ ______

3. $3 \times \frac{1}{3} =$ ______

4. $\frac{3}{4} \times \frac{2}{5} =$ ______

5. $\frac{1}{6} \times \frac{1}{8} =$ ______

6. $\frac{3}{5} \times \frac{7}{9} =$ ______

7. $\frac{1}{5} \times \frac{3}{8} =$ ______

8. $7 \times \frac{5}{6} =$ ______

9. $\frac{1}{2} \times \frac{3}{4} =$ ______

10. $6 \times \frac{5}{9} =$ ______

11. $8 \times \frac{4}{7} =$ ______

12. $9 \times \frac{5}{6} =$ ______

13. $\frac{3}{5} \times \frac{2}{3} =$ ______

14. $\frac{2}{7} \times \frac{4}{9} =$ ______

15. $\frac{5}{8} \times \frac{6}{7} =$ ______

16. $\frac{4}{5} \times \frac{2}{5} =$ ______

17. $8 \times \frac{3}{4} =$ ______

18. $\frac{8}{9} \times \frac{5}{6} =$ ______

19. $\frac{3}{4} \times \frac{3}{8} =$ ______

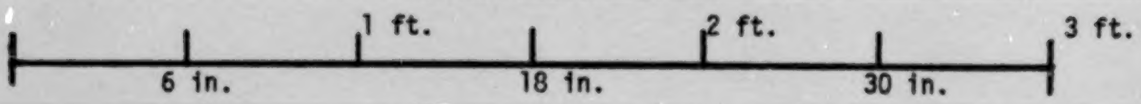
20. $9 \times \frac{6}{7} =$ ______

21. $3 \times \frac{8}{9} =$ ______

22. $5 \times \frac{7}{8} =$ ______

L-34

YARDSTICK MULTIPLICATION



1. $\frac{1}{3}$ of 1 yard = ______ inches.

2. $\frac{2}{3}$ of 1 yard = ______ inches.

3. $\frac{3}{3}$ of 1 yard = ______ inches.

4. $\frac{1}{2}$ of 1 yard = ______ inches.

5. $\frac{1}{4}$ of 1 yard = ______ inches.

6. $\frac{3}{4}$ of 1 yard = ______ inches.

7. $\frac{1}{6}$ of 1 yard = ______ inches.

8. $\frac{2}{6}$ of 1 yard = ______ inches.

9. $\frac{5}{6}$ of 1 yard = ______ inches.

10. $\frac{5}{3}$ of 1 yard = ______ inches.

11. $\frac{4}{9}$ of 1 yard = ______ inches.

12. $\frac{5}{4}$ of 1 yard = ______ inches.

13. $\frac{7}{6}$ of 1 yard = ______ inches.

TENTHS A PLENTY

1. Divide the line above into ten equal parts.

2. Where do the following fractions come on this line?

   $\frac{8}{10}, \frac{1}{10}, \frac{7}{10}, \frac{5}{10}, \frac{3}{10}, \frac{2}{10}, \frac{9}{10}, \frac{4}{10}, \frac{6}{10}$

   Identify by writing them under the line above.

3. Can you think of another way of writing $\frac{5}{10}$? ________________

4. Which of the following fractions are larger than $\frac{1}{2}$? Circle them.

   $\frac{1}{10}, \frac{9}{10}, \frac{4}{10}, \frac{6}{10}, \frac{3}{10}, \frac{7}{10}, \frac{2}{10}, \frac{8}{10}$

5. To find $\frac{1}{10}$ of anything, we divide it by ______________.

6. What is...?

   a. $\frac{1}{10}$ of 100 = __________

   b. $\frac{1}{10}$ of 1 ton = __________ lbs.

   c. $\frac{1}{10}$ of 1 dollar = __________ cents

   d. $\frac{1}{10}$ of 1 mile = __________ feet

   e. $\frac{1}{10}$ of 1 hour = __________ minutes

   f. $\frac{1}{10}$ of 5 feet = __________ feet

   g. $\frac{7}{10}$ of 1 dollar = __________ cents

   h. $\frac{1}{10}$ of 1 mile = __________ yards

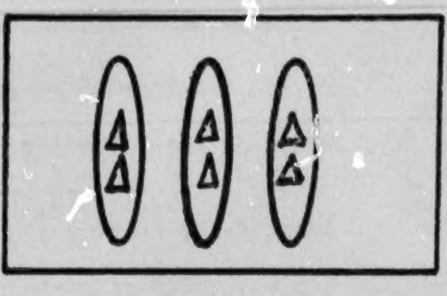
   i. $\frac{9}{10}$ of 1 hour = __________ minutes

   j. $\frac{7}{10}$ of 1 ton = __________ lbs.

   k. $\frac{3}{10}$ of 1 dollar = __________ cents

   l. $\frac{7}{10}$ of 1 mile = __________ feet

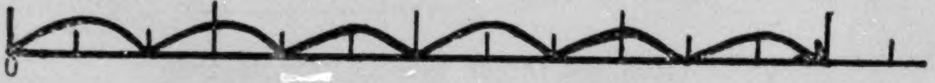
FRENZIED DIAGRAMS



1. What is $\frac{2}{3}$ of 6? ____________________

How can the diagram help you find $\frac{2}{3}$ of 6?

2. Let us look at a number line for 6 x $\frac{2}{3}$.



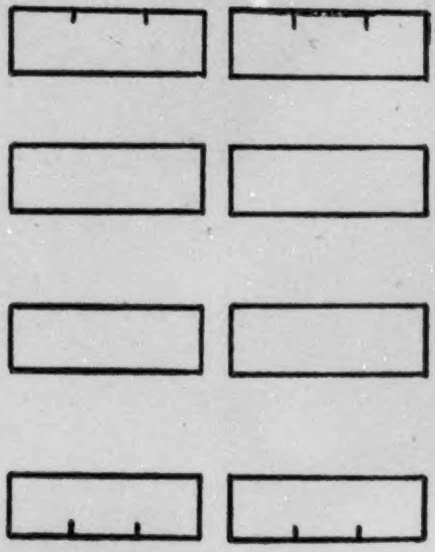
a. What is the size of each group that has been marked with the curved line? ____________

b. How many groups have been marked off? ____________

c. What multiplication fact does this number line suggest? ____________

3. Does $\frac{2}{3}$ x 6 give you the same answer as 6 x $\frac{2}{3}$? ____________

4. The following exercises show you an easy way to arrange 8 items so that you can take $\frac{2}{3}$ of them.



a. Divide each of the eight rectangles at the right into three equal parts.

b. Shade $\frac{2}{3}$ of each rectangle.

c. Have you shaded $\frac{2}{3}$ of 8 rectangles? ______

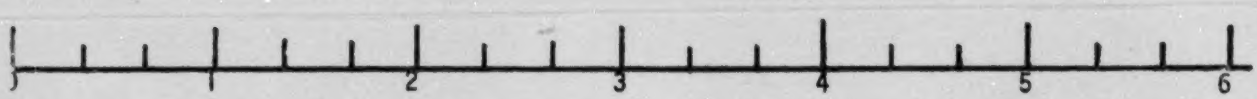
d. What is the size of each small block? ______

e. How many blocks have you shaded? ______

f. Write a fraction that shows how much you have shaded. ____________

g. Does $\frac{2}{3}$ of 8 = $\frac{2}{3}$ x 8? ____________

h. Use the number line below to find 8 x $\frac{2}{3}$.



i. $\frac{2}{3}$ x 8 = 8 x $\frac{2}{3}$ = ____________

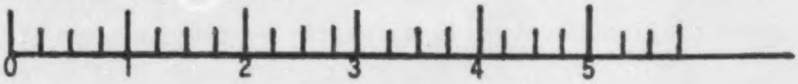
j. Do you get the same answer in i as in exercise f? ____________

L-36A

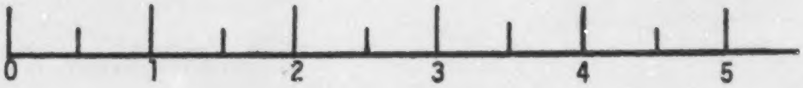
FRENZIED DIAGRAMS

Use the number lines to find the answers.

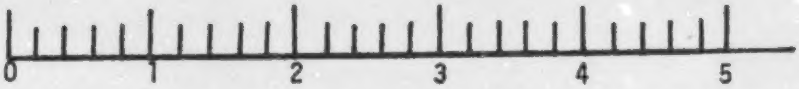
5. $5 \times \frac{3}{4}$



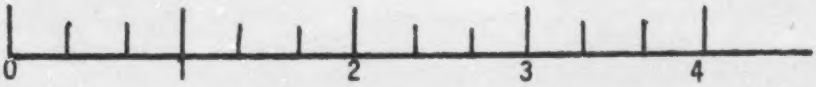
6. $9 \times \frac{1}{2}$



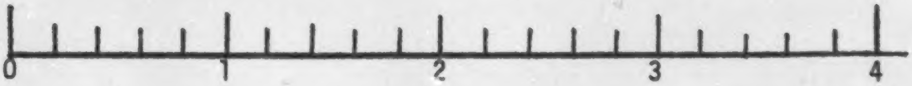
7. $7 \times \frac{3}{5}$



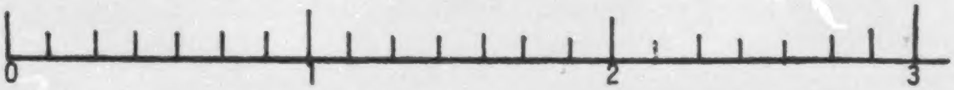
8. $\frac{2}{3} \times 5$



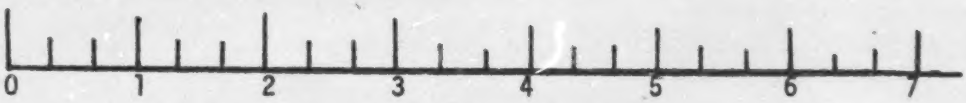
9. $6 \times \frac{3}{5}$



10. $4 \times \frac{5}{7}$



11. $10 \times \frac{2}{3}$



12. What natural number (counting numbers and zero) is $\frac{7}{1}$? ________ $\frac{8}{1}$? ________ $\frac{3}{1}$? ________

13. Express 5 as a fraction in the form of $\frac{5}{\square}$

14. $5 \times \frac{3}{4} = \frac{5}{x} \times \frac{3}{4} = \frac{x}{x\ 4} = \frac{15}{4}$

15. What type of fraction is $\frac{15}{4}$? ____________

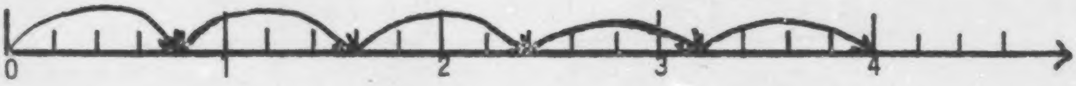
16. In practical applications, we often used mixed numbers as answers.
Write $\frac{15}{4}$ as a mixed number. ___________

L-36

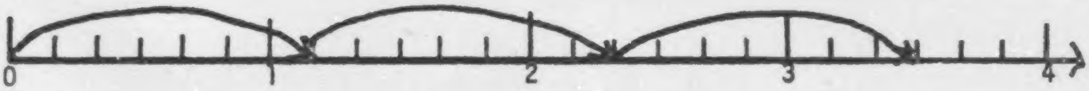
FRENZIED DIAGRAMS

What multiplication fact is suggested by these number lines?

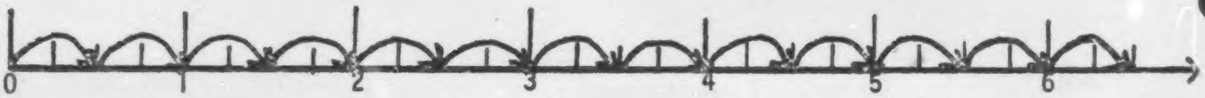
17.



18.



19.



20. Show how to multiply $\frac{a}{b} \times \frac{c}{d} =$

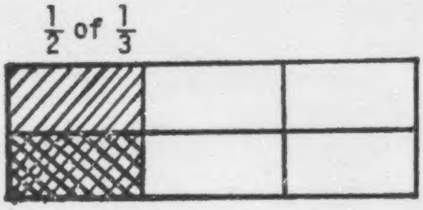
MORE FRENZIED DIAGRAMS

1. a. Shade $\frac{1}{3}$ of the rectangle like this. ▨

   b. Shade $\frac{1}{2}$ of the shaded part like this. ▧

   c. What part of the rectangle is shaded twice?

   Give your answer in two ways.

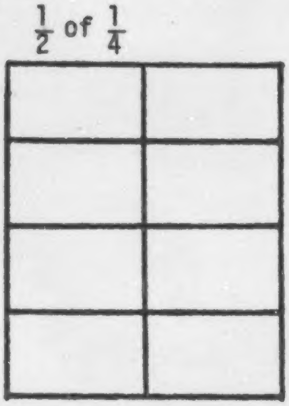


2. a. Shade $\frac{1}{4}$ of the rectangle like this. ▨

   b. Shade $\frac{1}{2}$ of the shaded part like this. ▧

   c. What part of the rectangle is shaded twice?

   Give your answer in two ways.

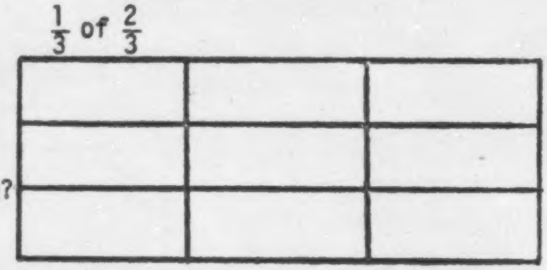


3. a. Shade $\frac{2}{3}$ of the rectangle like this. ▨

   b. Shade $\frac{1}{3}$ of the shaded part like this. ▧

   c. What part of the rectangle is shaded twice?

   Give your answer in two ways.



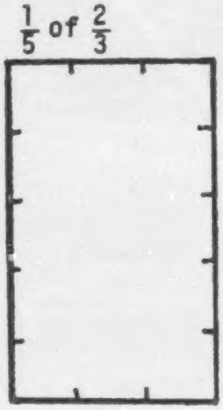
4. a. Shade $\frac{2}{3}$ of the rectangle like this. ▨

   b. Shade $\frac{1}{5}$ of the shaded part like this. ▧

   c. What part of the rectangle is shaded twice?

   Give your answer in two ways.

   d. Is $\frac{1}{5}$ of $\frac{2}{3}$ the same as $\frac{1}{5} \times \frac{2}{3}$?



L-3DA

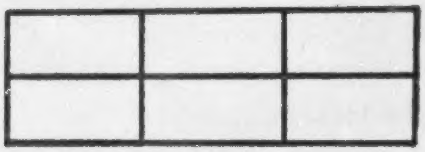
MORE FRENZIED DIAGRAMS

ANSWERS

5. $\frac{1}{3}$ of $\frac{1}{2}$ =

Shade $\frac{1}{2}$

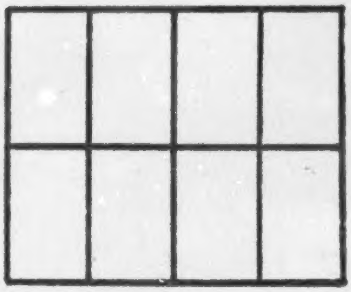
Shade $\frac{1}{3}$ of the shaded



6. $\frac{1}{2}$ of $\frac{1}{4}$ =

Shade $\frac{1}{4}$

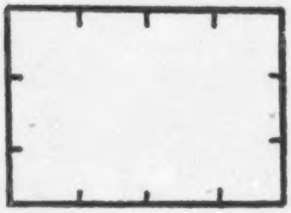
Shade $\frac{1}{2}$ of the shaded



7. $\frac{1}{3}$ of $\frac{1}{4}$ =

Shade $\frac{1}{4}$

Shade — of the shaded



8. $\frac{1}{3}$ of $\frac{1}{5}$ =

Shade $\frac{1}{5}$

Shade — of the
shaded

9. $\frac{1}{2}$ of $\frac{1}{5}$ =

Shade $\frac{1}{5}$

Shade —

10. $\frac{1}{6}$ of $\frac{1}{2}$ =

Shade $\frac{1}{2}$

Shade —

11. Is $\frac{1}{6}$ of $\frac{1}{2}$ the same as $\frac{1}{6} \times \frac{1}{2}$?

L-37B

MORE FRENZIED DIAGRAMS

DIAGRAMS ANSWERS

12. $\frac{1}{2}$ of $\frac{1}{16}$ =

Shade $\frac{1}{16}$

Shade $\frac{1}{2}$ of the shaded

13. $\frac{1}{3}$ of $\frac{1}{12}$ =

Shade —

Shade —

14. $\frac{1}{4}$ of $\frac{5}{6}$ =

Shade —

Shade —

15. $\frac{1}{3}$ of $\frac{2}{5}$ =

Shade —

Shade —

16. $\frac{2}{3}$ of $\frac{4}{7}$ =

Shade —

Shade —

17. Is $\frac{2}{3}$ of $\frac{4}{7}$ the same as $\frac{2}{3} \times \frac{4}{7}$?

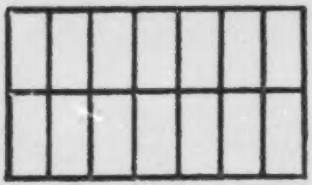
Can you think of another method?

18. What will give you the answers to the problems above which uses only the numerals without the diagrams?

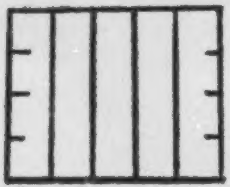
L-37e

MORE FRENZIED DIAGRAMS

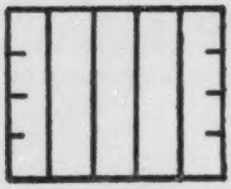
Shade these rectangles to show:



19. $\frac{1}{2} \times \frac{3}{7} =$ ______

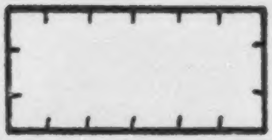


20. $\frac{1}{4} \times \frac{3}{5} =$ ______

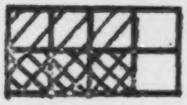


21. $\frac{3}{4} \times \frac{3}{5} =$ ______

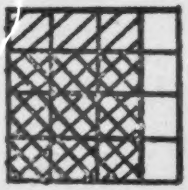
Give the multiplication problem and answer that each of the following diagrams suggests:



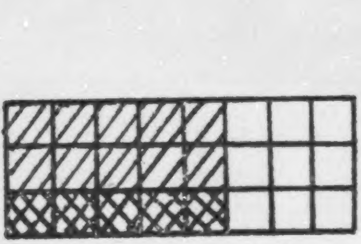
22. $\frac{1}{3} \times \frac{5}{6} =$ ______



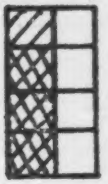
23. ______________



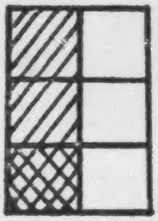
24. ______________



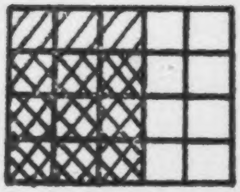
25. ______________



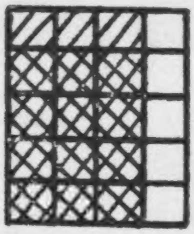
26. ______________



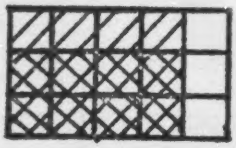
27. ______________



28. ______________



29. ______________



30. ______________

JUMPING DIVISION

Directions: Solve the following problems:

1. $6 \times \square = 1$
2. $8 \times \square = 1$
3. $\square \times 10 = 1$
4. $\square \times 1 = 1$
5. $\frac{1}{3} \times \square = 1$
6. $\square \times \frac{1}{2} = 1$
7. $\frac{2}{3} \times \frac{3}{2} = \square$
8. $\frac{5}{7} \times \frac{7}{5} = \square$
9. $\square \times \frac{1}{11} = 1$
10. $\frac{4}{9} \times \frac{9}{4} = \square$
11. $\frac{2}{5} \times \square = 1$
12. $\frac{4}{13} \times \square = 1$
13. $\square \times \frac{11}{21} = 1$
14. $\square \times \frac{5}{8} = 1$
15. $\square \times \frac{2}{17} = 1$
16. $\frac{21}{53} \times \square = 1$
17. $\frac{101}{373} \times \square = 1$
18. $\square \times \frac{43}{37} = 1$
19. $\square \times \frac{256}{243} = 1$
20. $\frac{512}{81} \times \square = 1$
21. $2\frac{1}{2} \times \square = 1$
    Hint: What is another name for $2\frac{1}{2}$?
22. $\square \times 3\frac{2}{3} = 1$
23. $5\frac{1}{4} \times \square = 1$
24. $2\frac{1}{3} \times \square = 1$

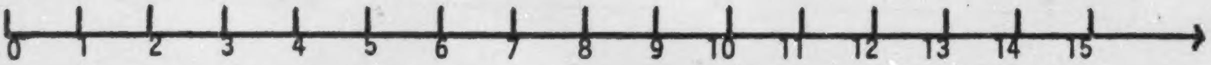
25. If the product of two numbers is one, they are reciprocals. Name the reciprocals of:

26. $\frac{3}{5}$ 27. 9 28. $1\frac{1}{2}$ 29. $1\frac{7}{8}$

30. What is the one number that has no reciprocal? ____________

(You will use what you have learned about reciprocals to work problems involving division of fractions.)

31. Find $12 \div 3$ on the number line below.



What is $12 \times \frac{1}{3}$? ________ What is the relation between 3 and $\frac{1}{3}$? ________

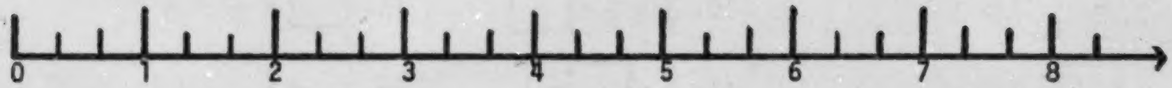
What can you say about the answers in the two problems

$12 \div 3 =$ ________ and

$12 \times \frac{1}{3} =$ ________?

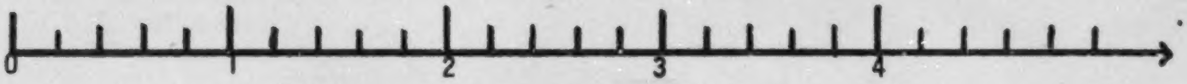
JUMPING DIVISION

32. Find $6 \div \frac{2}{3}$ on a number line.



What is $6 \times \frac{3}{2}$? ________ What is the relation between $\frac{2}{3}$ and $\frac{3}{2}$? ________

What can you say about the answers in the two problems $6 \div \frac{2}{3} =$ _____ and
$6 \times \frac{3}{2} =$ _____?



33. Find $3\frac{1}{5} \div \frac{2}{5}$ on the number line. (above)

What is $3\frac{1}{5} \times \frac{5}{2}$? _______ What is the relation between $\frac{2}{5}$ and $\frac{5}{2}$?

What can you say about the answers in the two problems $3\frac{1}{5} \div \frac{2}{5} =$ _____ and
$3\frac{1}{5} \times \frac{5}{2} =$ _____?

34. Tell how you can work all division of fraction problems by multiplying.

Example: $\frac{3}{5} \div \frac{2}{7}$ will give you the same answer as $\frac{3}{5} \times \frac{7}{2}$.

35. $\frac{5}{6} \div \frac{3}{5}$ will give you the same answer as ________

36. $1\frac{2}{3} \div \frac{4}{5}$ will give you the same answer as ________

37. Give the reciprocal of each number.

a) 6 ____________
d) $\frac{3}{7}$ ____________
g) $3\frac{2}{3}$ ____________

b) $\frac{1}{3}$ ____________
e) $\frac{11}{19}$ ____________
h) $4\frac{1}{2}$ ____________

c) $\frac{2}{5}$ ____________
f) $\frac{21}{5}$ ____________
i) $6\frac{1}{5}$ ____________

HOW MANY ARE IN ONE?

I. Cut the circle into two (2) equal parts.

A. Shade one of the two parts.

B. What part of the circle is shaded? ______________

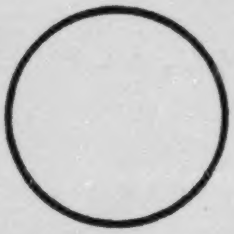
C. How many of these parts are in the circle? ____________

D. fractional part shaded — number of times in the circle

$\boxed{} \times \boxed{} = \boxed{?}$

- -

HOW MANY ARE IN ONE?



II. Cut the circle into four (4) equal parts.

A. Shade one of the four parts.

B. What part of the circle is shaded? ____________

C. How many of these parts are in the circle? __________

D. fractional part shaded — number of times in the circle

$\boxed{} \times \boxed{} = \boxed{?}$

JUMPING DIVISION

38. Write the multiplication problem that will give you the same answer as the indicated division problem.

a) $\frac{3}{4} \div \frac{5}{7}$ ________________

b) $\frac{1}{2} \div \frac{2}{3}$ ________________

c) $3\frac{2}{5} \div \frac{4}{5}$ ________________

d) $\frac{5}{6} \div 1\frac{1}{2}$ ________________

e) $\frac{9}{11} \div 2\frac{3}{4}$ ________________

f) $\frac{3}{8} \div 1\frac{1}{8}$ ________________

39. Find the answers to the following problems.

a) $\frac{5}{6} \div \frac{1}{3}$

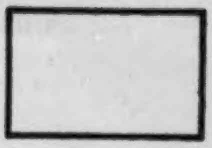
b) $\frac{7}{2} \div \frac{3}{5}$

c) $\frac{5}{11} \div \frac{3}{8}$

d) $\frac{1}{7} \div \frac{1}{3}$

e) $\frac{237}{392} \div \frac{237}{392}$

HOW MANY ARE IN ONE?



III. Cut the rectangle into three (3) equal parts.

A. Shade one of the three parts.

B. What part of the rectangle is shaded? ___________

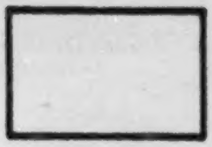
C. How many of these parts are in the rectangle? __________

D. fractional part shaded   number of times in the rectangle

☐ x ☐ = ?

- -

HOW MANY ARE IN ONE?



IV. Cut the rectangle into three (3) equal parts.

A. Shade two of the three parts.

B. The shaded section would be what part of the original rectangle? __________

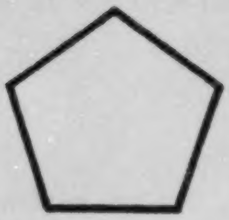
C. Trace on your paper a space that is the same as the shaded portion.

D. How many times can you cover this space with all the pieces of the original rectangle? _________________

E. fractional part shaded   number of times you covered the shaded space

☐ x ☐ = ?

HOW MANY ARE IN ONE?



V. Cut the pentagon into five (5) equal parts.

A. Shade three of the five parts.

B. The shaded section would be what part of the original pentagon? __________

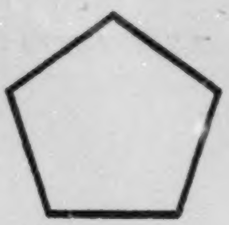
C. Trace on your paper a space that is the same as the shaded portion.

D. How many times can you cover this space with all the pieces of the original pentagon? ________________

E.

fractional part shaded		number of times you covered the shaded space		
☐	x	☐	=	?

HOW MANY ARE IN ONE?



VI. Cut the pentagon into ten (10) equal parts.

A. Shade seven of the ten parts.

B. The shaded section would be what part of the original pentagon? __________

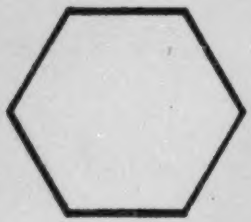
C. Trace on your paper a space that is the same as the shaded portion.

D. How many times can you cover this space with all the pieces of the original pentagon? ______________

E.

fractional part shaded		number of times you covered the shaded space		
☐	x	☐	=	?

HOW MANY ARE IN ONE?



VII. Cut the hexagon into six (6) equal parts.

A. Shade five of the six parts.

B. The shaded section would be what part of the original hexagon?

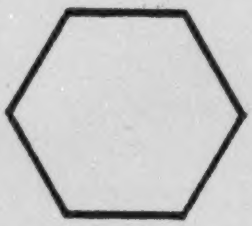
C. Trace on your paper a space that is the same as the shaded portion.

D. How many times can you cover this space with all the pieces of the original hexagon? ______________

E. fractional part shaded — number of times you covered the shaded space

$\boxed{} \times \boxed{} = \boxed{?}$

HOW MANY ARE IN ONE?



VIII. Cut the hexagon into twelve (12) equal parts.

A. Shade five of the twelve parts.

B. The shaded section would be what part of the original hexagon?

C. Trace on your paper a space that is the same as the shaded portion.

D. How many times can you cover this space with all the pieces of the original hexagon? ______________

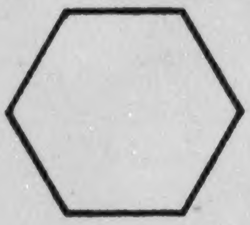
E. fractional part shaded — number of times you covered the shaded space

$\boxed{} \times \boxed{} = \boxed{?}$

COMMON D

I. Problem: $\frac{4}{6} \div \frac{1}{6}$

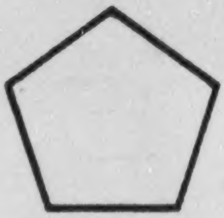
1. Cut the hexagon into six equal pieces.
2. On another sheet of paper, trace a space equal to 4 of your pieces.
3. Now, with one of the equal pieces, see how many of them would be needed to cover the space you have traced.
4. Then there are __, $\frac{1}{6}$'s in $\frac{4}{6}$ or $\frac{4}{6} \div \frac{1}{6} = ?$



COMMON D

II. Problem: $\frac{7}{10} \div \frac{1}{10}$

1. Cut the pentagon into ten equal pieces.
2. On another sheet of paper, trace a space equal to 7 of your pieces.
3. Now, with one of your equal pieces, see how many of them would be needed to cover the space you have traced.
4. Then there are __, $\frac{1}{10}$'s in $\frac{7}{10}$ or $\frac{7}{10} \div \frac{1}{10} = ?$



COMMON D

III. Problem: $\frac{3}{4} \div \frac{1}{8}$ (Pick the geometric figure you wish.)

1. Cut your geometric figure into 8 equal parts. Why 8 equal parts?

2. On another sheet of paper, trace a space that is equal to $\frac{3}{4}$ of your original geometric figure.

$$\frac{3}{4} = \frac{?}{8}$$

3. Now, with $\frac{1}{8}$ of your original figure, see how many times you can cover the space you have traced.

4. Then there are __, $\frac{1}{8}$'s in $\frac{3}{4}$ or $\frac{3}{4} \div \frac{1}{8} = ?$

COMMON D

IV. Problem: $\frac{2}{3} \div \frac{1}{2}$ (Pick the geometric figure you wish.)

1. Cut your geometric figure into 6 equal parts. Why 6 equal parts?

2. On another sheet of paper, trace a space equal to $\frac{2}{3}$ of your geometric figure.

$$\frac{2}{3} = \frac{?}{6}$$

3. Consider $\frac{1}{2}$, $\frac{1}{2} = \frac{?}{6}$, to be one unit. How many of these units would be needed to cover the space you have traced?

4. Then there are _?_, $\frac{1}{2}$'s in $\frac{2}{3}$ or $\frac{2}{3} \div \frac{1}{2} = ?$

COMMON D

V. Problem: $\frac{5}{6} \div \frac{1}{4}$ (Pick the geometric figure you wish.)

1. Cut your figure into twelve equal parts. Why 12 equal parts?

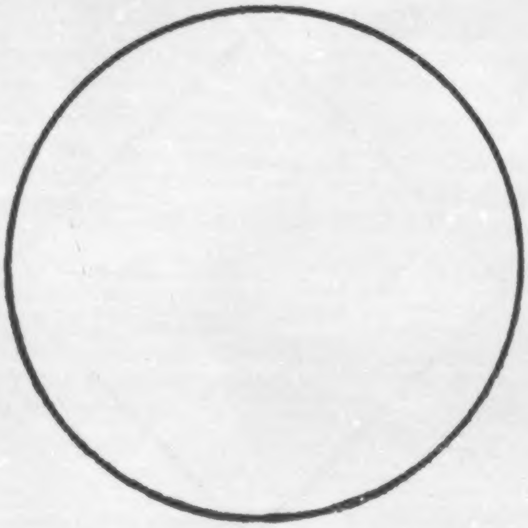
2. On another sheet of paper, trace a space equal to $\frac{5}{6}$ of your geometric figure.

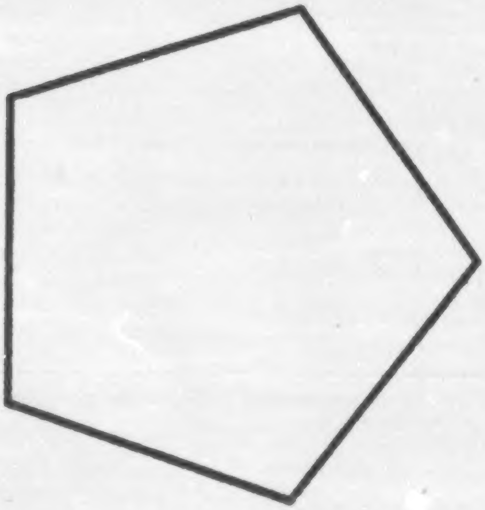
$$\frac{5}{6} = \frac{?}{12}$$

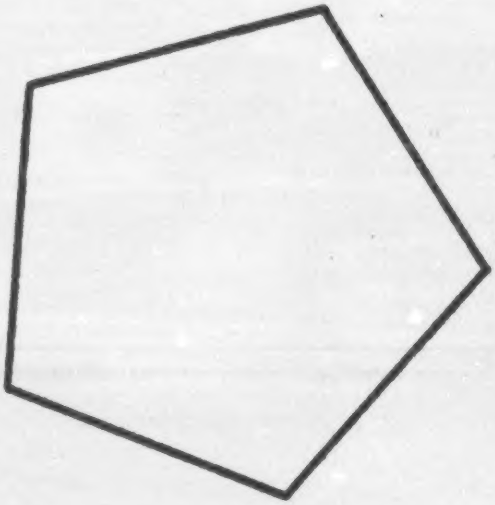
3. Consider $\frac{1}{4}$, $\frac{1}{4} = \frac{?}{12}$, to be one unit. How many of these units would be needed to cover the space you have traced?

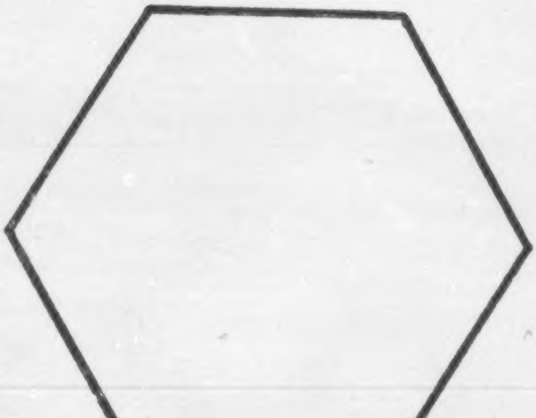
4. Then there are $\underline{?}$, $\frac{1}{4}$'s in $\frac{5}{6}$ or $\frac{5}{6} \div \frac{1}{4} = ?$

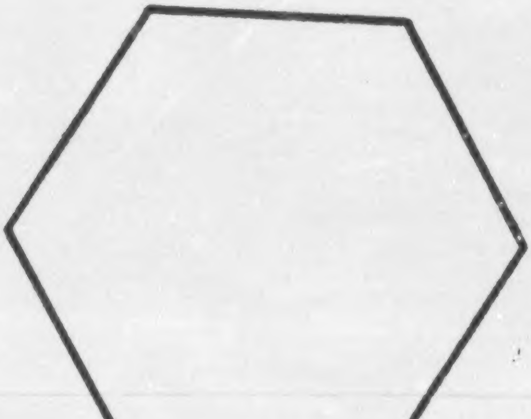
COMMON D



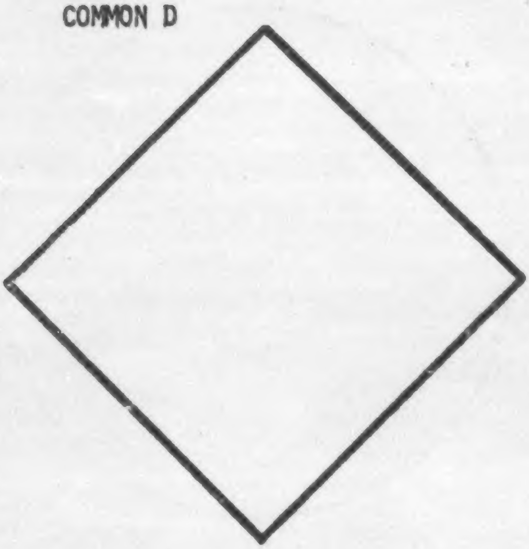


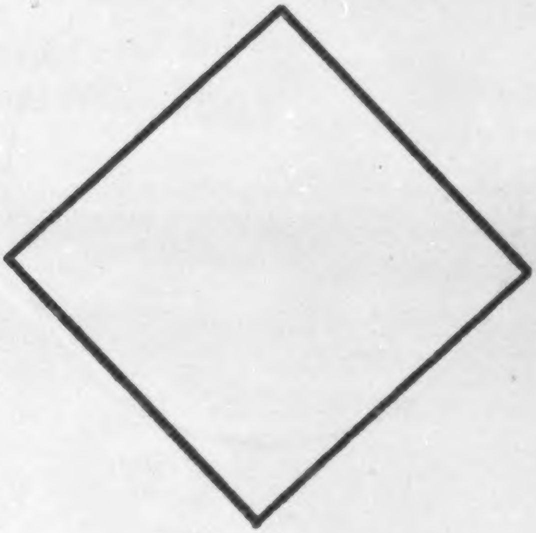


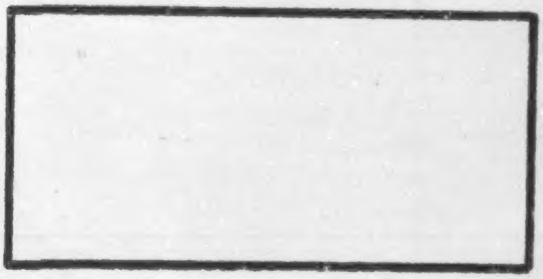




COMMON D







RECOGNIZING AND WRITING THE RATIONAL IDENTITY ELEMENT

I. What is the Rational Identity Element?

1. Carefully examine the multiplication 3 x 1 = 3 and choose a or b as an answer:

   a) Multiplication by 1 does not change the product.
   b) Multiplication by 1 does change the product.

2. Go to Branch A.

3. Given the set $\left\{\frac{2}{2}, \frac{15}{15}, \frac{1/2}{1/2}, \frac{2/3}{2/3}, \frac{71}{71}, \frac{1.3}{1.3}\right\}$

   Choose the statement which best describes the set:

   a) All members of the set are equal to 1.
   b) All members of the set are not equal to 1.

4. Go to Branch D.

II. Recognizing the Rational Identity Element.

1. Tell which of the members of the following set are not examples of the Rational Identity Element:

$$\left\{\frac{15}{15}, \frac{9}{3}, \frac{17}{17}, \frac{10}{100}, \frac{2.5}{2.5}\right\}$$

2. Go to Branch F.

3. Tell which elements of the following set are examples of the Rational Identity Element:

$$\left\{\frac{100}{10}, \frac{1}{1}, \frac{.5}{.5}, \frac{2/3}{2/3}, \frac{36}{6}\right\}$$

4. Go to Branch B.

III. Writing the Rational Identity Element?

1. Use the number listed in the following set as the denominators of the Rational Identity Element:

$$\left\{\frac{7}{8}, 1.7, 100, 9\right\}$$

2. Go to Branch E.

3. Use the numbers listed in the following set as the numerators of the Rational Identity Element:

$$\left\{10, 3.3, \frac{5}{6}, 7\right\}$$

4. Go to Branch C.

RECOGNIZING AND WRITING THE RATIONAL IDENTITY ELEMENT

A. The correct answer is choice a.

1. Since multiplication by the number 1 has no effect on the product, 1 is therefore called the identity element for multiplication.
2. The rational identity element is the number 1 written in any fractional form.

   Go to I-3.

B. $\frac{1}{1}$, $\frac{.5}{.5}$ and $\frac{2/3}{2/3}$ are examples of the rational identity element.

Go to III.

C. $\frac{10}{10}$, $\frac{3.3}{3.3}$, $\frac{5/6}{5/6}$, $\frac{7}{7}$

D. The correct answer is choice a.

Each fraction is a rational identity element because each fraction is equal to 1.

Go to II.

E. $\frac{7/8}{7/8}$, $\frac{1.7}{1.7}$, $\frac{100}{100}$, $\frac{9}{9}$

Go to III-3.

F. $\frac{9}{3}$, $\frac{10}{100}$ are not examples of the rational identity element.

Go to II-3.

GETTING THE JUMP ON DIVISION

1. a) how many quarters are in $.75? ____________

b) how many $\frac{1}{4}$ dollars are in $.75? ____________

c) how many $\frac{1}{4}$ dollars are in $\frac{3}{4}$ dollars? ____________

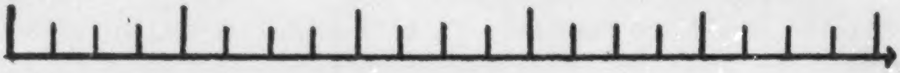
d) write part c) as a division problem.

2. $24 \div 3$, $\frac{24}{3}$ and $3\overline{)24}$ are different ways to express the same division problem.

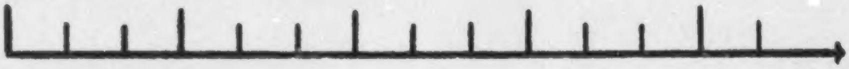
The divisor is ________, the quotient is ________, and the dividend is __________.

Use the number lines to find:

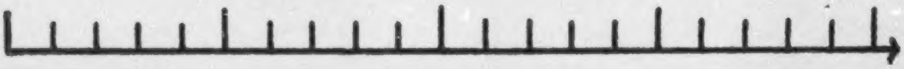
3. $3\frac{3}{4} \div \frac{3}{4}$ ________



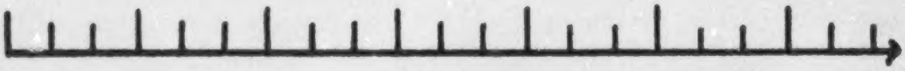
4. $1\frac{1}{3} \div \frac{2}{3}$ ________



5. $3\frac{3}{5} \div \frac{3}{5}$ ________

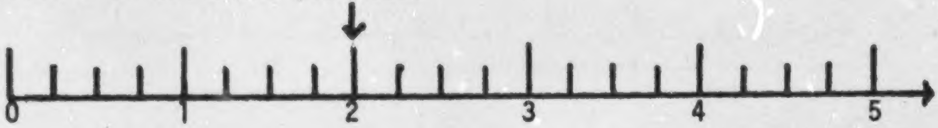


6. $5\frac{1}{3} \div \frac{4}{3}$ ________

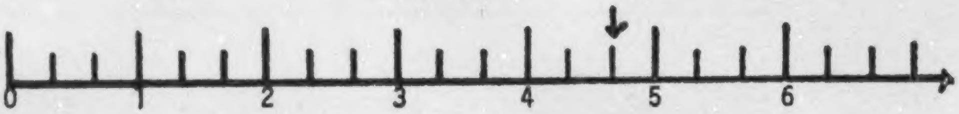


For each of problems 7 - 11, show on the number lines how to solve the problem and then write the answer on the blank provided.

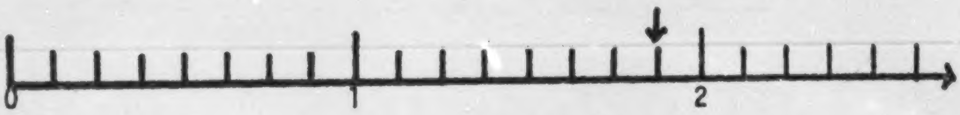
7. $2 \div \frac{1}{4} =$ ____



8. $4\frac{2}{3} \div \frac{2}{3} =$ ____

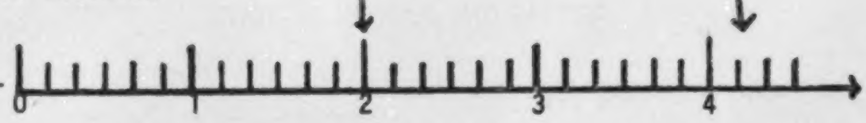


9. $1\frac{7}{8} \div \frac{5}{8} =$ ____

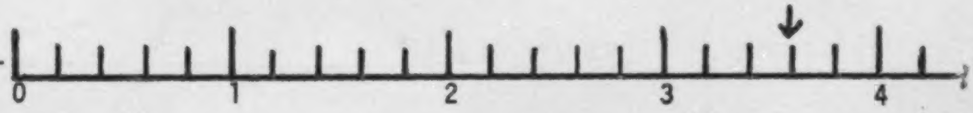


GETTING THE JUMP ON DIVISION

10. $4\frac{1}{6} \div \frac{5}{6} =$ ______



11. $3\frac{3}{5} \div \frac{3}{5} =$ ______

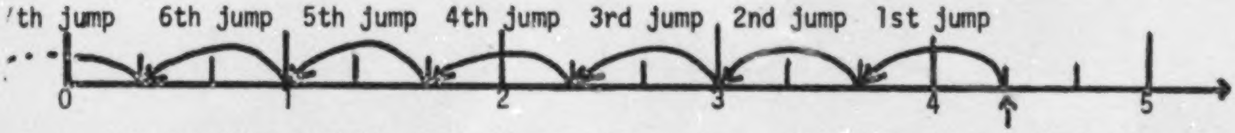


12. In each exercise from 7 - 11 name the divisor, the quotient and the dividend.

Exercise	Divisor	Quotient	Dividend
7			
8			
9			
10			
11			

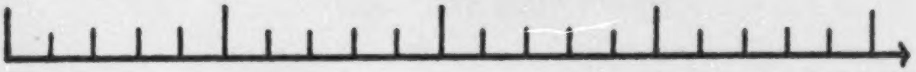
13. The quotients in all the exercises you have worked were counting numbers (1, 2, 3, ···). This will not always be true.

Work $4\frac{1}{3} \div \frac{2}{3}$ on the number line and tell between which two jumps the quotient lies.


th jump
6th jump
5th jump
4th jump
3rd jump
2nd jump
1st jump
0
1
2
3
4
5

The quotients of the following problems are not whole numbers. Work these problems on the number lines and write on the blanks the numbers that tell between which two jumps the quotient lies.

14. $2\frac{3}{5} \div \frac{2}{5}$

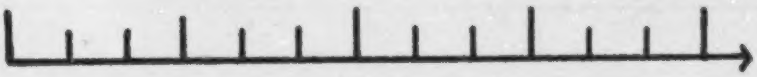


______

15. $4\frac{1}{4} \div \frac{3}{4}$

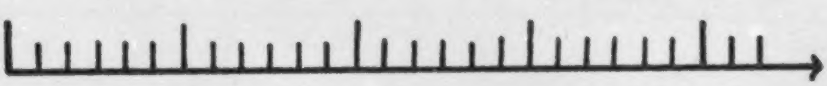
______

16. $3\frac{2}{3} \div \frac{2}{3}$



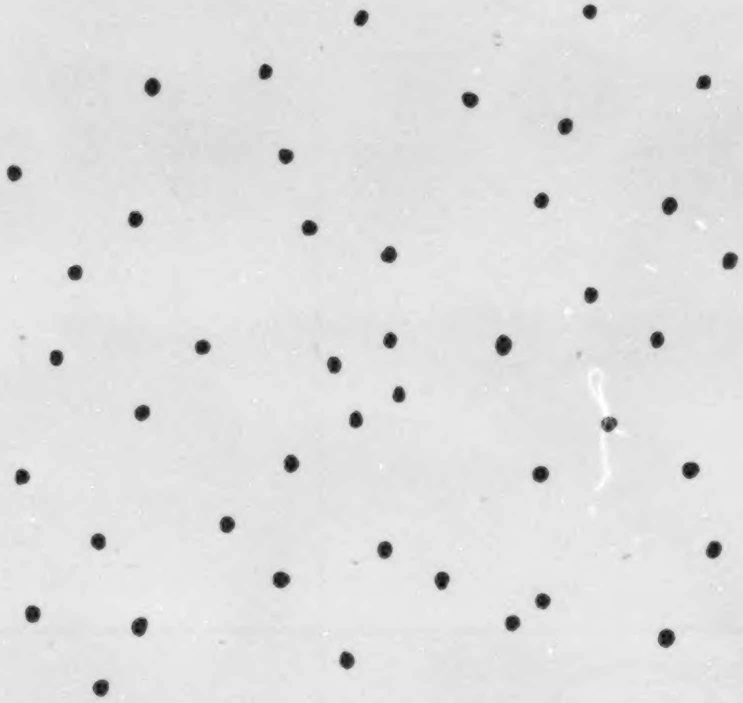
______

17. $3\frac{2}{3} \div \frac{5}{6}$



______

ST. PATRICK'S DAY FUN



1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.

WHICH IS GREATER?

55 minutes

or

1 hour?

WHICH IS GREATER?

1 gallon

or

9 pints?

WHICH IS GREATER?

1 gallon

or

5 quarts?

WHICH IS GREATER?

$\frac{1}{2}$ hour

or

35 minutes?

L-44

WHICH IS GREATER?

$\frac{3}{4}$ hour

or

40 minutes?

WHICH IS GREATER?

3 ounces

or

$\frac{1}{4}$ pound?

WHICH IS GREATER?

3 quarts

or

7 pints?

WHICH IS GREATER?

7 ounces

or

$\frac{1}{2}$ pound?

WHICH IS GREATER?

$\frac{3}{4}$ pound

or

14 ounces?

WHICH IS GREATER?

2 pounds

or

30 ounces?

WHICH IS GREATER?

12 ounces

or

$\frac{3}{4}$ pound?

WHICH IS GREATER?

30 inches

or

$\frac{3}{4}$ yard?

WHICH IS GREATER?

2 feet

or

$\frac{3}{4}$ yard?

WHICH IS GREATER?

18 ounces

or

1 pound?

WHICH IS GREATER?

$\frac{1}{4}$ yard

or

1 foot?

WHICH IS GREATER?

$\frac{1}{4}$ pound

or

6 ounces?

WHICH IS GREATER?

$\frac{1}{4}$ yard

or

9 inches?

WHICH IS GREATER?

4 feet

or

50 inches?

WHICH IS GREATER?

$\frac{1}{2}$ yard

or

20 inches?

WHICH IS GREATER?

34 ounces

or

2 pounds?

WHICH IS GREATER?

$\frac{1}{2}$ pound or 10 ounces?

WHICH IS GREATER?

7 inches

or

$\frac{1}{2}$ foot?

WHICH IS GREATER?

2 feet

or

26 inches?

WHICH IS GREATER?

14 inches

or

1 foot?

WHICH IS GREATER?

$\frac{3}{4}$ hour

or

45 minutes?

WHICH IS GREATER?

1 hour

or

70 minutes?

WHICH IS GREATER?

25 minutes

or

$\frac{1}{2}$ hour?

WHICH IS GREATER?

5 pints

or

2 quarts?

WHICH IS GREATER?

1 hour

or

50 minutes?

WHICH IS GREATER?

100 minutes or 2 hours?

WHICH IS GREATER?

20 minutes

or

$\frac{1}{4}$ hour?

WHICH IS GREATER?

16 inches

or

1 foot?

WHICH IS GREATER?

90 minutes

or

2 hours?

WHICH IS GREATER?

$\frac{1}{4}$ yard

or

4 inches?

WHICH IS GREATER?

28 inches

or

1 yard?

WHICH IS GREATER?

$\frac{3}{4}$ hour

or

50 minutes?

CONNECT THE DOTS

Directions: Find the answers to the problems below and then find that answer in the picture. Connect the lines of your answers, in order, so that you will have a completed picture.

a. $\frac{5}{6} - \frac{2}{3} =$

b. $\frac{4}{5} - \frac{1}{2} =$

c. $\frac{1}{4} + \frac{1}{2} =$

d. $\frac{2}{3} + \frac{1}{6} =$

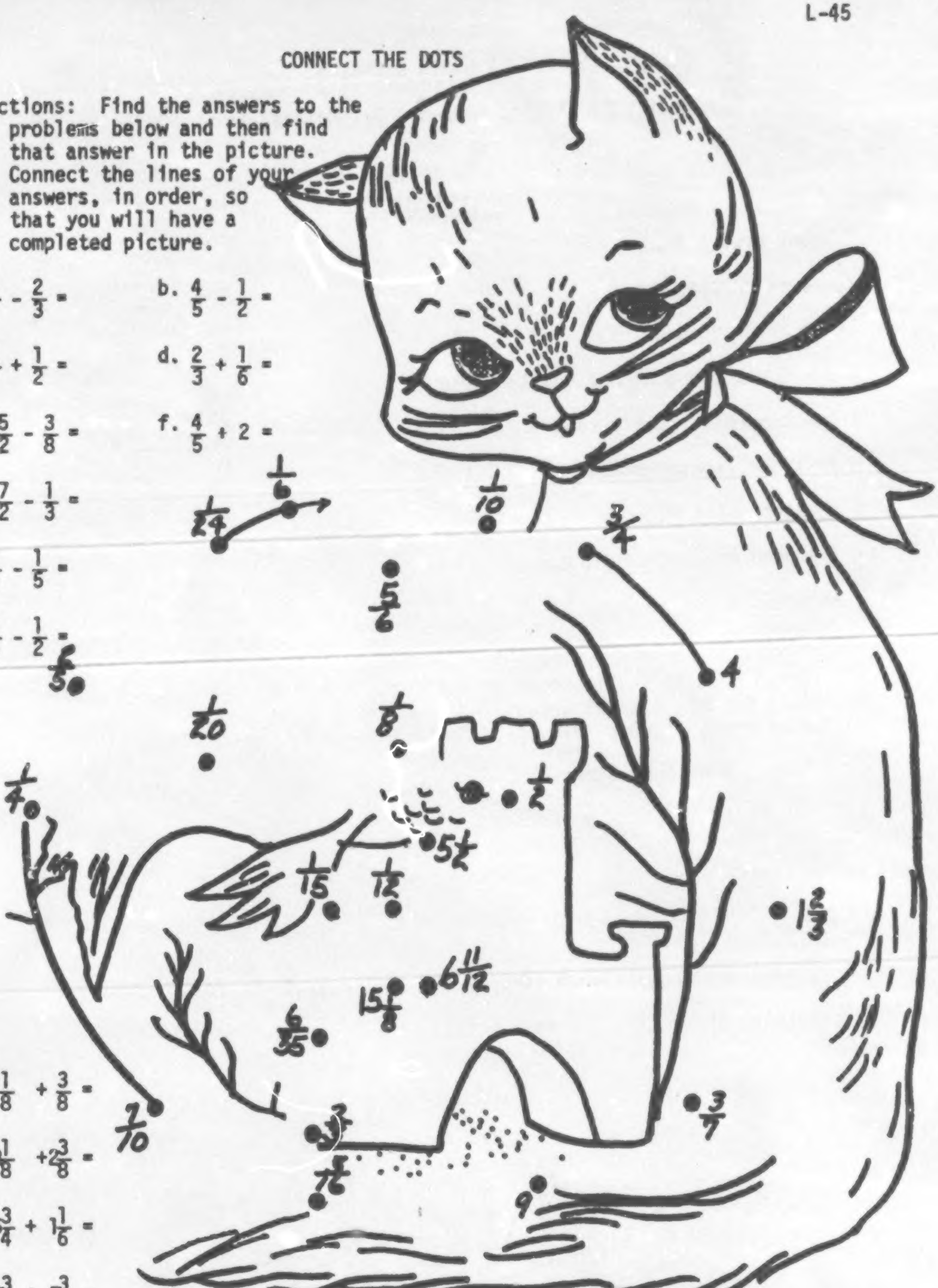
e. $\frac{5}{12} - \frac{3}{8} =$

f. $\frac{4}{5} \div 2 =$

g. $\frac{7}{12} - \frac{1}{3} =$

h. $\frac{1}{4} - \frac{1}{5} =$

i. $\frac{5}{8} - \frac{1}{2} =$


1/6
1/24
1/10
3/4
5/6
4
6/5
1/20
1/8
1/4
1/2
5 1/2
1/15
1/12
1 2/3
6 11/12
15 1/8
6/35
1
7/10
3
3/7
7/20
9

j. $\frac{1}{8} + \frac{3}{8} =$

$3\frac{1}{8} + 2\frac{3}{8} =$

$5\frac{3}{4} + 1\frac{1}{6} =$

$9\frac{3}{8} + 5\frac{3}{4} =$

$\frac{1}{4} \times \frac{1}{3} =$

o. $\frac{1}{3} \times \frac{1}{5} =$

p. $\frac{3}{7} \times \frac{2}{5} =$

q. $\frac{4}{9} \div \frac{2}{3} =$

r. $\frac{7}{8} \div 2\frac{1}{2} =$

s. $\frac{3}{8} \div \frac{1}{2} =$

t. $6 \div \frac{2}{3} =$

u. $\frac{4}{7} \times \frac{3}{4} =$

v. $\frac{5}{6} \times 2 =$

w. $6 \times \frac{2}{3} =$

BETTER HOMES & GARDENS

Meredith Publishing Company Des Moines, Iowa 50303

SKILLET BURGERS

1 pound ground beef

$1\frac{1}{2}$ cups chopped onion

$1\frac{1}{2}$ cups chopped celery

1 8 - ounce can seasoned tomato sauce

1 can condensed tomato soup

$\frac{1}{8}$ teaspoon Tabasco sauce

1 teaspoon salt

$\frac{1}{2}$ teaspoon monosodium glutamate

$\frac{1}{4}$ teaspoon chili powder

Brown meat in small amount of hot fat. Add onion and celery; cook till tender, but not brown. Add remaining ingredients. Simmer, uncovered, about 20 minutes. Spoon into split toasted buns.

Makes 5 or 6 servings.

Exercise:

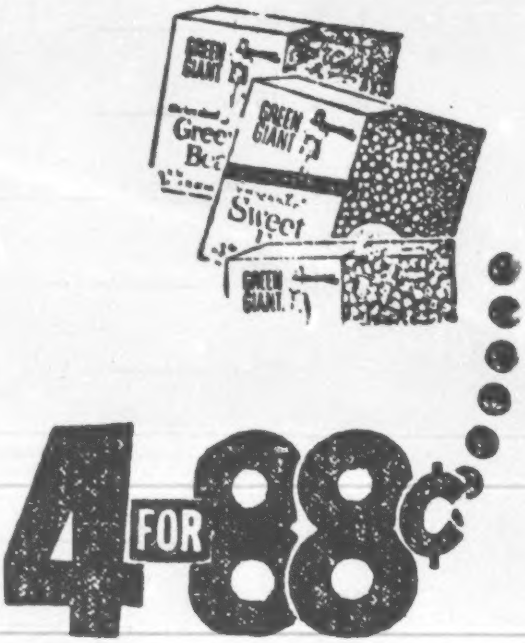
Find the amount of each item if the recipe is to be for $\frac{1}{2}$ as many people, and 3 times as many people.

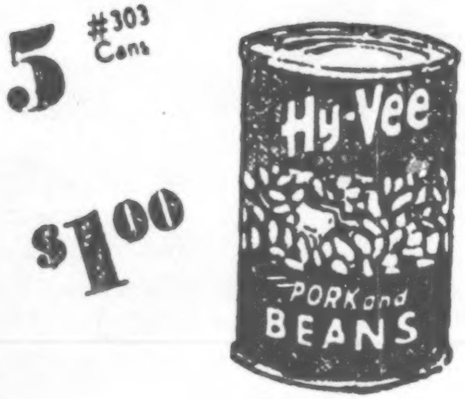
MAKING FRACTIONS FROM THE GROCERY ADS

Directions: What fraction would you have if you purchased the following?

Make the fraction, and write the price.

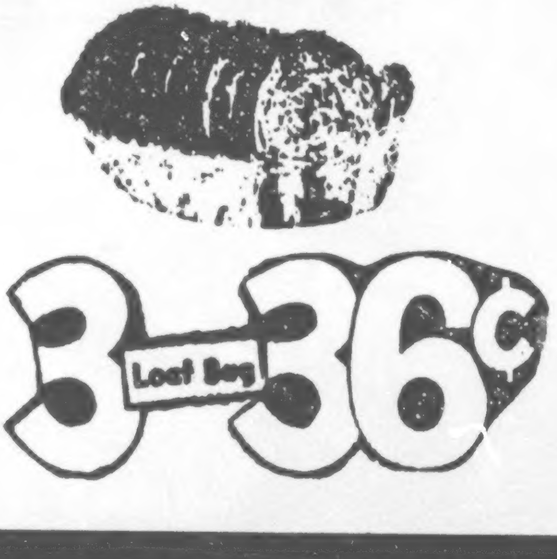
	Amount	Fraction	Price
a.	3 packages	$\frac{3}{4}$	.66
b.	1 package		
c.	2 packages		


GREEN GIANT
Green Beans
Sweet Peas
4 FOR 88¢


5 #303 Cans
$1.00
Hy-Vee
PORK and BEANS

	Amount	Fraction	Price
d.	1 can		
e.	2 cans		
f.	3 cans		
g.	4 cans		
h.	5 cans		

	Amount	Fraction	Price
i.	1 loaf		
j.	2 loaves		
k.	3 loaves		


3 Loaf Bag 36¢

FRACTIONAL $

1. $ .25 = __________ of a dollar or __________ cents

2. $ .75 = __________ of a dollar or __________ cents

3. $ .30 = __________________ or ____________________

4. $ .20 = __________________ or ____________________

5. $ .80 = __________________ or ____________________

6. $ .05 = __________________ cents

7. $ .95 = __________________ cents

8. $ .65 = __________________ cents

9. $ .15 = __________________ cents

10. $1.25 = __________________ dollars

11. $2.50 = __________________ dollars

12. $1.75 = __________________ dollars

13. $1.60 = __________________ dollars

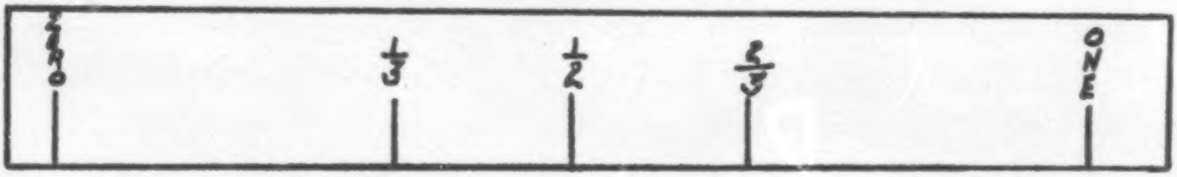
14. $3.80 = __________________ dollars

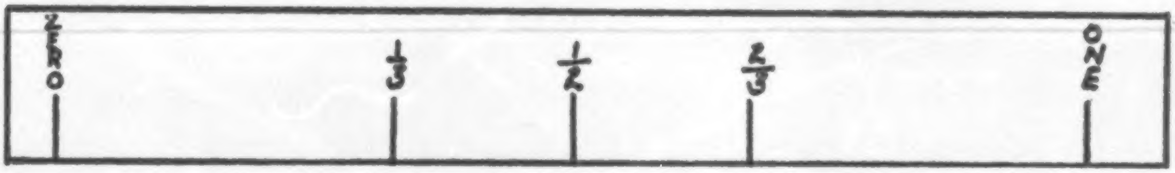
15. $5.00 = __________________ dollars

SLIDING RULERS

The following number lines have been divided into halves and thirds.

Cut these two lines out.





1. Find a way to mark the location of $\frac{1}{2} + \frac{1}{3}$ using these number lines.

2. Is it possible to use the above number lines to name the answer for $\frac{1}{2} + \frac{1}{3}$?

__________ Explain:

3. Find three different names for each of the following fractions, using the smallest counting numbers (1, 2, 3, ···) possible for the denominators.

a. $\frac{1}{2}$
b. $\frac{1}{3}$

4. Can you find a pair of fractions in exercise 3a and exercise 3b that have a common denominator? __________

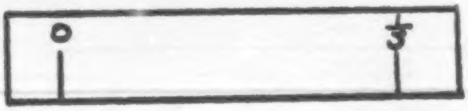
What is the denominator? __________

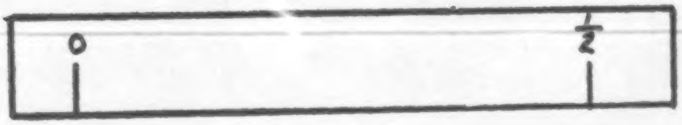
5. Mark each of the two number lines that you cut out before exercise 1 in sixths. Explain how you could use these number lines marked in $\frac{1}{6}$'s to name the answer for $\frac{1}{2} + \frac{1}{3}$.

SLIDING RULERS

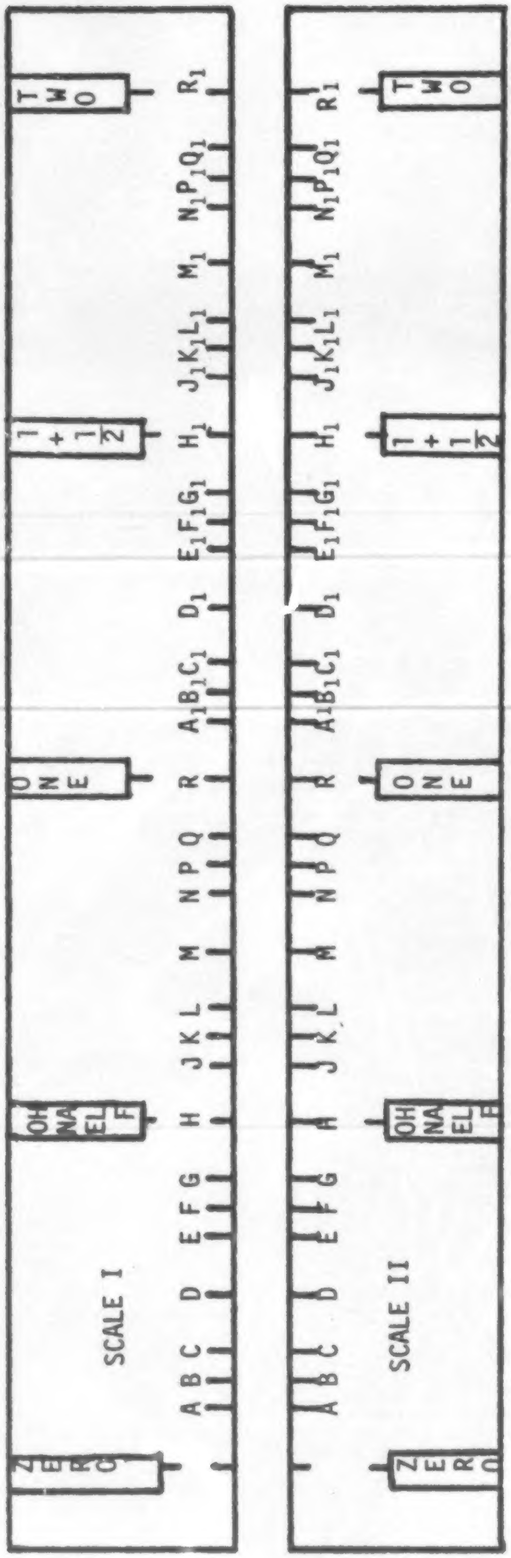
6. Cut out the following two number lines.

   Using one of the number lines that you marked in sixths in exercise 5, and the two number lines that you just cut out, show how you can locate and name the answer for $\frac{1}{2} + \frac{1}{3}$.





SLIDING RULERS


SCALE I
SCALE II
ZERO
A B C D E F G H J K L M N P Q R
OH NA EL F
ONE
A_1 B_1 C_1 D_1 E_1 F_1 G_1 H_1 J_1 K_1 L_1 M_1 N_1 P_1 Q_1 R_1
1 + 1/2
TWO

A	$\frac{1}{12}$
B	$\frac{1}{8}$
C	$\frac{1}{6}, \frac{2}{12}$
D	$\frac{1}{4}, \frac{2}{8}, \frac{3}{12}$
E	$\frac{1}{3}, \frac{2}{6}, \frac{4}{12}$
F	$\frac{3}{8}$
G	$\frac{5}{12}$
H	$\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{6}{12}$
J	$\frac{7}{12}$
K	$\frac{5}{8}$
L	$\frac{2}{3}, \frac{4}{6}, \frac{8}{12}$
M	$\frac{3}{4}, \frac{6}{8}, \frac{9}{12}$
N	$\frac{5}{6}, \frac{10}{12}$
P	$\frac{7}{8}$
Q	$\frac{11}{12}$
R	$1, \frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \frac{6}{6}, \frac{8}{8}, \frac{12}{12}$
A_1	$1\frac{1}{12}$

Pictured at the left are two identical number lines. Each number line extends from 0 to 2.

Each letter corresponds to a certain number. The chart above tells you the number.

For example, letter K stands for $\frac{5}{8}$.

This means that K_1 corresponds to $1\frac{5}{8}$.

Letter M indicates $\frac{3}{4}$, $\frac{6}{8}$, and $\frac{9}{12}$.

M_1 indicates $1\frac{3}{4}$, $1\frac{6}{8}$, and $1\frac{9}{12}$.

Do the exercises on the following page.

SLIDING RULERS

7. From the chart, find a number that corresponds to

a) A __________

b) H __________

c) L __________

d) C __________

e) Q __________

f) D __________

8. From the chart, name the letter that corresponds to

a) $1\frac{7}{8}$ __________

b) $\frac{3}{4}$ __________

c) $\frac{7}{12}$ __________

d) $1\frac{1}{3}$ __________

e) $\frac{3}{6}$ __________

f) $1\frac{10}{12}$ __________

g) $1\frac{5}{8}$ __________

h) 1 __________

The two number lines that you have will be used just as the scales of a slide rule are used.

A very important fact to remember is that the number lines begins at ZERO, not at the end of the paper.

Exercise 9 explains how to use the scales to find $\frac{2}{3} + \frac{3}{4}$.

9. What letter corresponds to $\frac{2}{3}$? __________ $\frac{3}{4}$? __________

a) Find L on scale II.

b) Line up your scale so that ZERO on scale I is over L on scale II.

c) Locate M on scale I.

d) What is the letter on scale II under M on scale I?

e) What is the number that corresponds to G_1? $\frac{2}{3} + \frac{3}{4} =$

10. What letter corresponds to $\frac{3}{8}$? __________ $\frac{1}{4}$? __________

a) Find F on scale II.

b) Line up your scale so that zero on scale I is over F on scale II.

c) Locate D on scale I.

d) What is the letter on scale II under D on scale I?

e) What is the number that corresponds to K? $\frac{3}{8} + \frac{1}{4} =$

SLIDING RULERS

11. What letter corresponds to $\frac{5}{12}$? __________ $\frac{1}{3}$? __________

    a) Find G on scale II.

    b) Line up your scale so that zero on scale I is over G on scale II.

    c) Locate E on scale I.

    d) What is the letter on scale II under E on scale I?

    e) What is the number that corresponds to M? $\frac{5}{12} + \frac{1}{3} =$

Use your scales to find:

12. $1\frac{1}{2} + \frac{1}{3}$

13. $\frac{7}{8} + \frac{7}{8}$

14. $\frac{11}{12} + \frac{3}{4}$

15. $1\frac{1}{3} + \frac{5}{12}$

Use the chart to find a number that corresponds to each of the following.

16. a) B __________
    b) L_1 __________
    c) M_1 __________
    d) E __________
    e) J_1 __________
    f) F __________
    g) N __________
    h) G_1 __________

Use the chart to write the letter that corresponds to each of the following.

17. a) 2 __________
    b) $1\frac{7}{8}$ __________
    c) $\frac{5}{6}$ __________
    d) $\frac{11}{12}$ __________
    e) $\frac{2}{3}$ __________
    f) $1\frac{3}{6}$ __________
    g) $\frac{3}{4}$ __________
    h) $1\frac{1}{8}$ __________

SLIDING RULERS

18. Use your scale to find:

a) $\frac{3}{4} + \frac{3}{8}$ ____________________

b) $\frac{5}{12} + \frac{2}{3}$ ____________________

c) $1\frac{1}{3} + \frac{1}{4}$ ____________________

d) $\frac{11}{12} + \frac{5}{6}$ ____________________

e) $\frac{8}{12} + \frac{1}{3}$ ____________________

f) $1\frac{1}{6} + \frac{1}{4}$ ____________________

g) $\frac{2}{3} + \frac{5}{12}$ ____________________

h) $\frac{7}{8} + \frac{2}{4}$ ____________________

19. Tell why you cannot use your scales to find:

a) $1\frac{1}{2} + \frac{3}{4}$

b) $\frac{2}{3} + \frac{1}{8}$

c) $\frac{7}{12} + \frac{3}{8}$

d) $1\frac{5}{12} + \frac{5}{6}$

20. The answer to 19b lies between which two given numbers?

The answer to 19c lies between which two given numbers?

21. Use your scales to solve the following problem:

Jane needed $\frac{3}{4}$ of a yard of shelf paper for one shelf and $\frac{2}{3}$ of a yard for another shelf.

How much did she need altogether? ______________

RULERS IN REVERSE

Work with some of your classmates to find a method using your scales (L-49) or using two rulers for solving problems involving subtraction of fractions.

Use your scales to find answers to the following problems. You will not be able to name the answer in all problems. When you cannot name the answer, write the numbers on each side of the answer and nearest to it.

a) $\frac{7}{8} - \frac{1}{2}$

b) $1 - \frac{5}{6}$

c) $1\frac{3}{4} - \frac{3}{8}$

d) $2 - 1\frac{5}{6}$

e) $\frac{2}{3} - \frac{1}{2}$

f) $1\frac{1}{4} - \frac{7}{8}$

g) $1\frac{1}{12} - \frac{1}{4}$

h) $\frac{1}{8} - \frac{1}{12}$

i) $\frac{1}{3} - \frac{1}{4}$

Use your scales to solve the following problem:

James bought $1\frac{1}{4}$ pounds of candy yesterday. Today he has $\frac{1}{2}$ of a pound.

How much did he eat? ____________________

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University of Denver
Denver, Colorado 80210

(2) GIMMICKS
CILAMP
1350 E. Washington
Des Moines, Iowa 50316

(3) LAMP
CILAMP
1350 E. Washington
Des Moines, Iowa 50316

(4) Laboratory Processes in Mathematics Instruction
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